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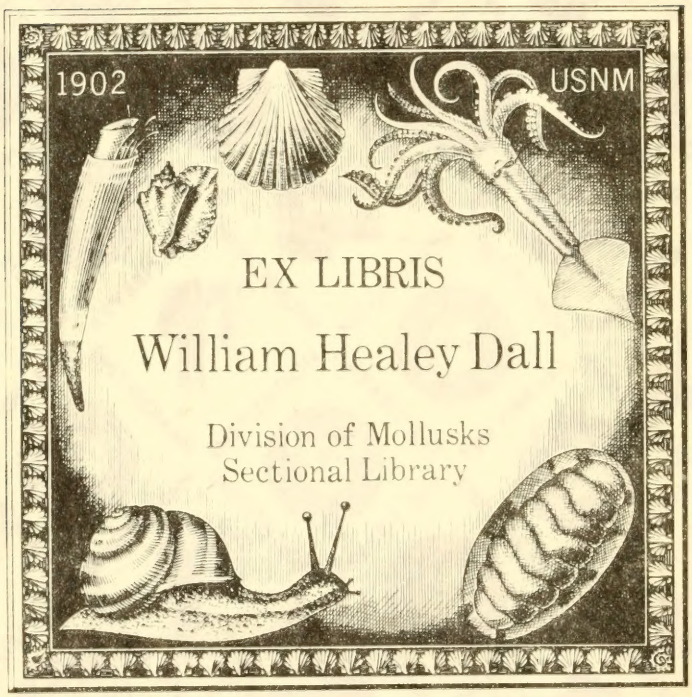
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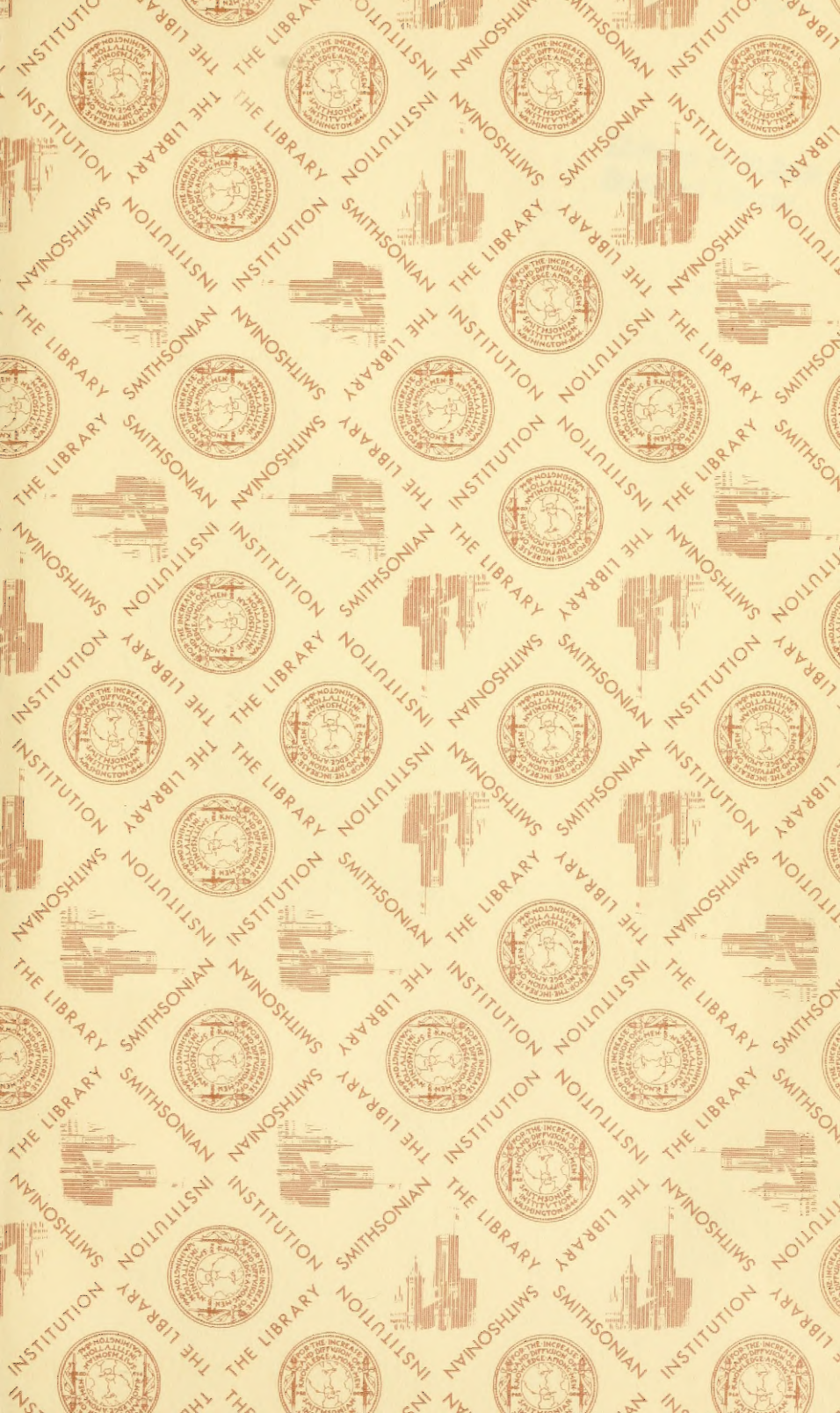
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THIRD CATALOGUE OF MOLLUSCA,

RECENTLY ADDED TO THE FAUNA OF THE NEW ENGLAND COAST AND THE ADJACENT PARTS OF THE ATLANTIC, CONSISTING MOSTLY OF DEEP-SEA SPECIES, WITH NOTES ON OTHERS PREVIOUSLY RECORDED.

WITH PLATES XLII, XLIII, XLIV.

BY A. E. VERRILL.

[FROM THE TRANSACTIONS OF THE CONNECTICUT ACADEMY, VOL. VI, PART II.]

New Haven.—April to June, 1885.

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[From the Transactions of the Connecticut Academy, Vol. VI, 1885.]

Catalogue of marine mollusca.

Third Catalogue of Mollusca recently added to the Fauna of the New England Coast and the adjacent parts of the Atlantic, consisting mostly of Deep-Sea Species, with Notes on others previously recorded.

By A. E. Verrill.

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The exploration of the Gulf Stream region was continued last season, under nearly the same conditions† as in 1883, by the U. S. Fish Commission steamer Albatross, Lieut. Z. L. Tanner, commander. The total number of stations occupied during the season was 141.‡ During the five trips, between July 20 and Sept. 28, ninety-three dredgings (at stations 2170 to 2262) were made. In most of these, a large beam-trawl was used very successfully, even at great depths.

Of these dredgings, 5 were in depths between 2000 and 2600 fathoms (4 successful); 20 were between 1000 and 2000 fathoms; 29 between 500 and 1000 fathoms; 8 between 300 and 500 fathoms; 16 between 75 and 300 fathoms; and 20 between 18 and 75 fathoms. The first trip was made while the steamer was on her way north from Norfolk, Va., and some of those stations were off the coast of Maryland, the most southern being in N. lat. 37° 57′, but most of the others were situated in the region south and southeast of Martha's Vineyard, though some of them were a long way off the coast. The five stations in depths below 2000 fathoms were more

* Number 1 of this series was published in these Transactions, vol. v, pp. 447–587, 1882; Number 2, in vol. vi, pp. 139–294, 1883.

† The naturalists associated with the writer in the work, in 1884, were Professor S. I. Smith, Mr. Sanderson Smith, Mr. Richard Rathbun, Professor L. A. Lee, Mr. B. F. Koons, Professor Edwin Linton, Mr. H. L. Bruner, Mr. J. H. Blake (as artist), Mr. J. E. Benedict (naturalist attached to the steamer), Mr. A. Baldwin, W. E. Safford, Ensign U. S. N., Mr. William Nye, and others. Mr. Peter Parker and R. H. Miner, Ensign U. S. N., worked on the fishes. The parties who went out dredging on the steamer varied from time to time. Usually not more than three or four naturalists besides Mr. Benedict were sent out.

‡ A complete list of these stations, with their location, temperatures, etc., has been published by me in the American Journal of Science, for February, 1885, vol. xxix, p. 154.

than half way to the Bermudas, and nearly east of the coast of Virginia, between N. lat. 36° 05′ 30″ and 37° 48′ 30″; and between W. long. 68° 21′ and 71° 55′.

At the end of the season, while on his way south, Capt. Tanner made another trip for the special purpose of exploring the shallow water regions in the vicinity of Cape Hatteras, where a very interesting fauna had been discovered by the Albatross in 1883. On this trip the first three hauls (stations 2263 to 2265) were made off Chesapeake Bay, Oct. 18, in 70, 167, and 430 fathoms, with interesting results; and 45 stations (2266 to 2310) were occupied October 19 to 21, in the region off Cape Hatteras. Of these, one (No. 2300) was in 671 fathoms; four were in depths between 111 and 322 fathoms (Nos. 2266, 2299, 2306, 2310); six were between 50 and 80 fathoms; eight were between 30 and 50 fathoms; three, between 20 and 30 fathoms; and twenty-three, between 7 and 20 fathoms. This shallow water region yielded a rich harvest of shells and crustacea unknown on our Atlantic coast, including a considerable number of new forms. In the following list these shallow water mollusca, from less than 60 fathoms, are not included, but many of them will be enumerated in a subsequent paper by Miss K. J. Bush, who has been able to determine a large proportion of them. But there is still a large quantity of fine mixed bottom materials to be examined from the shallower dredgings.

The results this year were highly satisfactory, both in the way of physical observations and zoological discoveries. Large numbers of additions were made to the fauna, including representatives of nearly all classes of deep-sea animals. Many pelagic species were also secured in the surface nets, and especially in the trawl-wings. Among these there are some new forms and many others, including some Pteropoda and Heteropoda, that have not previously been observed so far north in the Gulf Stream.

Character of the deep-sea deposits.

Some very interesting and important discoveries were made in regard to the nature of the materials composing the sea-bottom under the Gulf Stream at great depths. These observations are very important, as regards the distribution of the animal life, which often depends directly upon the nature of the bottom, and of great interest from a geological point of view. Some of these observations are contrary to the experience of other expeditions, and not in

accordance with the generally accepted theories of the nature of the deposits far from land.

The bottom between 600 and 2000 fathoms, in other regions, has generally been found to consist mainly of "globigerina ooze," or, as in some parts of the West Indian seas, of a mixture of globigerina and pteropod ooze. Off our northern coasts, however, although there is a more or less impure globigerina ooze, at such depths, in most localities beneath the Gulf Stream, this is by no means always the case. The ooze is always mixed with some sand and frequently with much clay-mud.

In a number of instances* the bottom between 500 and 1200 fathoms has been found to consist of tough and compact clay, so thoroughly hardened that many large angular masses, sometimes weighing more than fifty pounds, have been brought up in the trawl, and have not been washed away appreciably, notwithstanding the rapidity with which they have been drawn up through about two miles of water. In fact, these masses of hard clay resemble large angular blocks of stone, but when cut with a knife they have a consistency somewhat like hard castile soap, and in sections are mottled with lighter and darker tints of dull green, olive, and bluish gray. When dried they develop cracks and break up into angular fragments. This material is genuine clay, mixed with more or less sand, showing under the microscope grains of quartz and feldspar with some scales of mica. More or less of the shells of *Globigerina* and other Foraminifera are contained in the clay, but they make up a very small percentage of the material.

In other localities, in 1000 to 1600 fathoms,† the bottom is covered

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* The following are some of the special localities where these clay masses were taken:

Station 2192, in 1060 fathoms, N. lat. 39° 46′ 30″, W. long. 70° 14′ 45″. Large blocks of sandy clay, some weighing about 100 pounds. It was estimated that about a ton was brought up.

Station 2230, in 1168 fathoms, N. lat. 38° 27′, W. long. 73° 02′. Large quantity of masses of hard, but sticky greenish blue clay, some masses varying to yellowish and buff colors.

Station 2171, in 444 fathoms, N. lat. 37° 59′ 30″, W. long. 73° 48′ 40″. Large lumps of bluish gray sandy mud.

† The following are some of the localities where such materials occurred:

Station 2208, in 1178 fathoms, N. lat. 39° 33′, W. long. 71° 16′ 15″. Large quantities of hard, crusty ferruginous clay. Also a rounded granite bowlder, weighing over 20 pounds.

Station 2228, in 1582 fathoms, N. lat. 37° 25′, W. long. 73° 06′. Large quantity

with, or largely composed of, hard, very irregular, flattened, crust-like concretions of clay and iron-oxide, with more or less manganese-oxide in the crevices and worm-burrows with which they are filled. At some localities a barrelful, or more, of such masses was brought up. They vary in size from a few ounces up to 20 pounds or more in weight, and from one inch to six inches in thickness. These masses afford attachments to many kinds of animals, including several species of *Brachiopods*, *Chitons*, and other shells, which could not exist on bottoms of soft ooze or mud.

Rounded bowlders and pebbles of granite, gneiss and other crystalline rocks occurred at a number of stations. These, like the concretions of clay, etc., often afford attachment for deep-sea *Brachiopods* and other shells, as well as for corals, gorgonians, hydroids, sponges, etc. One bowlder, station 2208, is referred to above. The following are other localities: station 2195, in 1058 fathoms, N. lat. 39° 44′, W. long. 70° 03′. A rounded granite bowlder, about four inches in diameter. Its surface was covered with adherent species of foraminifera and some annelid-tubes. Station 2226, in 2021 fathoms, N. lat. 37° 00′, W. long. 71° 54′. A large number of pebbles and small, rounded bowlders of granite, porphyry, etc., and some coal cinders. The pebbles were more or less covered with adherent forminifera, bryozoa, etc. Scattered bowlders and pebbles have also occurred at many other localities along the inner edge of the Gulf Stream. These have probably all been carried out there by the ice floating away from the adjacent coasts in spring.*

of irregular crusty and cavernous concretions and masses of ferruginous clay, with considerable black manganese-oxide lining the holes and cracks. The lower side of many of the masses consisted of sticky bluish clay. It was estimated that about a ton of this material came up. There were adhering to these hard masses some corals, gorgonians, hydroids and bryozoa, with the brachiopods, *Discina Atlantica* and *Waldheimia cranium*, in considerable numbers.

* A curious instance, quite unique in our experience, of the occurrence of abundant relics of human handiwork was observed this year. At station 2222, in 1537 fathoms, N. lat. 39° 03′ 15″, W. long. 70° 50′ 45″, beneath the Gulf Stream, a large quantity of common bricks, with mortar and soot still adhering to them, was brought up in the trawl. Some were nearly entire, but most were in fragments. Annelid tubes, brachiopods, and other forms of deep-sea life were attached to them in small quantities, showing that they had not been on the bottom very long. One of the Brachiopods, which occurred on the bricks in considerable numbers, is *Atretia gnomon* J., which had not been previously recorded from off our coast. These bricks may have come from a wreck, or they may have formed the deck-furnace of some whaling vessel, thrown overboard on the homeward trip. At any rate, the accident of hitting

In all our ten localities between 2000 and 3000 fathoms, the bottom has been "globigerina ooze." We have never met with the "red clay" which ought to occur at such depths, according to the observations made on the cruise of the Challenger.

The temperatures observed with the improved thermometers now used on the Albatross were between 36°·4 and 37°·00 F., in 2000 to 2600 fathoms. But temperatures essentially the same as these were also taken in 1000 to 1500 fathoms, and even in 965 fathoms one observation gave 36°·8 F. It follows from these observations that nearly the minimum temperature is reached at about 1000 fathoms in this region.

CEPHALOPODA.

Ancistrocheirus megaptera Verrill, sp. nov.

PLATE XLII, FIGURES 1, 1*a*.

Body small, rather short, with an acute posterior end, extending a little beyond the posterior border of the fin. Fins very large, thick and strong, attached nearly the entire length of the body, and together forming a broad, rhombic figure, with the outer angles behind the middle; anteriorly the attachment of the fin does not reach quite to the edge of the mantle, and the front edge forms a slight rounded lobe in front of the attachment; posteriorly the fins are nearly united, across the back, but leave the acute, posterior tip of the body free for a short distance. The front edge of the mantle recedes in a broad curve ventrally, but has slightly prominent lateral lobes and a broad obtuse dorsal angle, which extends farther forward than the lateral ones. The head is rather large, with large eyes, furnished with thin free lids. The siphon is rather large, with two small dorsal bridles. The connective cartilages on its base are rather small, ear-shaped, much as in *Ommastrephes*. The arms are rather large, not very unequal in size, the dorsal ones slightly smaller than the others; all are unusually rounded and most of them, in our specimen, have lost their tips. They all bear two alternating rows of small, prominent sharp claws, which are not very closely arranged. The inner face is not separated from the sides by a distinct margin. The tentacular

upon the precise locality of such relics is very curious. Otherwise than in this instance we have rarely found in deep water any human traces except coal cinders from steamers.

arms are wanting. Color, in alcohol, orange-brown, due to numerous purple and brown specks scattered pretty uniformly over the surface, both above and below; the outer portions of the fins appear to have been transparent; the surface of the body appears to have been entirely smooth and destitute of tubercles, although the specimen is so much injured as to make this a little uncertain.

Length of body to front edge of mantle, 44^{mm}; length of free caudal portion, 6^{mm}; length of the attachment of fin, 34^{mm}; from front margin of fin to mantle edge, 3·5^{mm}; breadth across fins, 56^{mm}; length of head, from dorsal cartilage to base of dorsal arms, 19^{mm}; length of dorsal arms, 24^{mm}; diameter at base, 3·5^{mm}; diameter of lateral arms, 4^{mm}.

A single mutilated specimen (No. 40,128) was taken at station 2235, in 707 fathoms, 1884.

This species closely resembles *A. Verranyi*, recorded from the Indian Ocean, but it apparently differs from the latter in having larger fins and in being destitute of the rows of tubercles on the mantle; the arms also appear to differ in their proportions.

Teleoteuthis (Onychia) agilis Verrill, sp. nov.

PLATE XLII, FIGURES 2, 2*a*.

Body elongated, rather slender, with a rather small caudal fin, which is confined to about the posterior third of the body, and has a transversely rhombic form, with rounded angles and margins, the posterior edge is continuous across the end of the body, without any notch, and united to the body to its extreme tip. The dorsal mantle-edge is cut nearly square across, with only a faint angle in the middle; below each eye there is a somewhat prominent angle and the ventral side is regularly concave. The head is moderately large and the eyes are not very prominent. The arms are relatively long, prismatic, nearly equal in size and length, but the dorsal ones are somewhat shorter than the others. The third pair of arms are compressed and have a somewhat prominent keel on the distal half. The arms bear two regular, well separated rows of moderately large, suckers, largest along the middle of the arms, becoming smaller proximally, and disappearing above the base. The suckers are swollen in the middle and the somewhat contracted horny rim has the margin entire or nearly so. The sucker-bearing face of the arms is rather broad and margined on each side by a narrow but distinct membrane. The tentacular arms are slender, longer than the sessile

arms, with the terminal club elongated and somewhat expanded. The club bears two central rows of prominent, incurved hooks, about twelve in each row, not counting the very small ones near the tips; the hooks in the lower row are much larger than those in the upper; alternating with these, along each margin, there is a row of small suckers, which extend to the extreme tip, becoming there very minute; towards the tips the hooks are reduced to a single median row. At the base of the club there is a group of six to eight small smooth suckers intermixed with small rounded tubercles. The inner face of the arm below the suckers is flat and white.

The color, in alcohol, is rather deep purplish brown, both above and below, but paler beneath; it is due to rather large, rounded and very distinct, brown, orange and purple chromatophores. Similar chromatophores cover the outer surfaces of the arms, while the inner surfaces are specked with very dark brown ones.

Length from end of body to base of arms, 43^{mm}; to edge of mantle, 46^{mm}; to front margin of fin, 16^{mm}; breadth across fin, 21^{mm}; length of dorsal arms, 25^{mm}; length of second pair, 28^{mm}; length of third pair, 28^{mm}; length of ventral arms, 28^{mm}; length of tentacular arms, 30^{mm}; length of club, 12^{mm}; its breadth, 2^{mm}.

The name *Teleoteuthis* was proposed by me in 1881, in place of *Onychia* Les., because the latter was preoccupied for a genus of insects by Hubner in 1816.

One specimen (No. 40,129), was taken at the surface at station 2225, off Chesapeake Bay.

Benthoteuthis, gen. nov.

Body rather short, well-rounded, oblong, blunt posteriorly. Fins small, rounded, with a narrow insertion, situated close to the posterior end. Head broad. Eyes large, with distinct lids and small anterior sinus. Siphon short and wide, in a smooth groove, without bridles, internal valve well-developed. The dorsal mantle-edge is free, with an obtuse median angle, projecting over the back of the head. Arms small and short, the dorsal ones shortest; the lateral ones keeled externally; web rudimentary; marginal membranes on the inner angles narrow. Suckers small, crowded, apparently in four rows. Tentacular arms long and slender, the sucker-bearing portion scarcely enlarged, bearing numerous minute, subequal suckers in many rows.

The pen is very thin, expanded into a broad lanceolate blade posteriorly, very slender, with the edges incurved so as to form a groove

in the middle portion, becoming gradually a little wider to the anterior end, which is thin and pen-like in form. The posterior tip is imperfect in the specimen dissected.

The connective cartilages on the sides of the mantle are simple, elongated, broadest posteriorly, tapering anteriorly, and somewhat curved downward in the middle, with a long, narrow, simple central fosse. The connective cartilages on the sides of the mantle are low, simple, longitudinal ridges, running back from the lateral angles of the mantle-edge. In the female there are two pairs of oblong, flattened nidamental glands, one pair on the ventral side below the heart, the other pair a little farther forward, lying between the gills and intestines and surrounding the oviducts, which are symmetrically developed, one on each side. The ovary is large, occupying the posterior ventral portion of the body-cavity.

This interesting genus shows, in several respects, marked embryonic or primitive characters, recalling the young stages of *Ommastrephes* and *Loligo*. These are seen especially in the small size, posterior position and form of the fins; in the form of the body, head and mantle; in the small short arms, with the dorsal pair shortest; in the small simple suckers; in the want of differentiation of the tentacular club and the uniformity of its minute suckers. The affinities of the genus are probably with the group represented by *Ommastrephes*, as shown by the distinct eye-lids and sinus, and by the character of the connective cartilages of the mantle. The pen, however, is somewhat like that of *Loligo* in form, but the form of the pen appears to be of little value in determining the affinities of the squids.

Benthoteuthis megalops Verrill, sp. nov.

PLATE XLIV, FIGURE 1.

Body rather short, thick, rounded, tapering slightly from the anterior margin backward; posterior extremity bluntly rounded; fins small, situated close to the end of the body, attached by rather short bases to the sides of the body, nearest the dorsal side, but not united to the end of the body posteriorly. The fins are somewhat rounded in outline, projecting both forward and backward beyond their basal or attached portion, the free posterior margin extending backward as far as or beyond the end of the body, which shows, in a dorsal view, as a rounded lobe between the fins. The anterior margin of the mantle extends far forward over the back of the head, which it partially conceals; on the dorsal side there is a slightly prominent,

angular, median lobe; at the eyes the lateral margin recedes in a broad curve, but projects forward in an angular point below each eye, while the ventral portion is cut away in a broad curve, so as to expose the tip of the siphon. The head is short, broad, swollen laterally, owing to the large size of the eyes, which are furnished with free lids, having a small angular sinus in front. The siphon is short and broad, with a smooth, shallow cavity behind it, without any distinct bridles; within, it has a well-developed valve.

The arms are small and short, the ventral ones largest and longest; the two lateral pairs are nearly equal; the dorsal pair decidedly the shortest and smallest. The arms are united at the base by a rudimentary web; they are somewhat angular at base and taper somewhat rapidly to slender tips; the inner surface is thickly covered with very small suckers, which appear to form about four irregular rows. The lateral arms have a narrow, membranous keel along the outer side, and all have narrow marginal membranes along the sucker-bearing surface. The tentacular arms are very long and slender, many times the length of the sessile arms, but more slender; they are rounded and of nearly uniform size throughout; the sucker-bearing portion is neither expanded into a club nor distinctly flattened, but bears a large number of very minute suckers arranged in many rows along the inner surface, the number of rows diminishing proximally.

Color, in alcohol, dark reddish brown over the entire surface of the body, head, and sessile arms, with the tentacular arms yellowish white. The color is due to very numerous and densely crowded chromatophores of rather large size. The color is most intense on the upper surfaces of the head and sessile arms; the lower side of the body is somewhat paler than the upper side. The eyeballs outside of the pupil are dull blue.

Length of a female specimen, from the posterior end to the anterior dorsal edge of the mantle, 57^{mm}; from the posterior end of the body to the anterior insertion of fins, 9^{mm}; to the posterior insertion, 2·5^{mm}; length of fin, 7^{mm}; breadth across both fins, about 26^{mm}; breadth across mantle anteriorly, 21^{mm}; length of head from dorsal cartilage to base of dorsal arms, 17^{mm}; from anterior edge of mantle to base of dorsal arms, 8^{mm}; length of dorsal arms, 20^{mm}; length of second pair, 23^{mm}; length of third pair, 23^{mm}; length of ventral arms, 25^{mm}; length of tentacular arms, 85^{mm}; greatest diameter, 2^{mm}; length of sucker-bearing portion, 13^{mm}; its diameter, about 1^{mm}.

Off Martha's Vineyard, at stations 2189 and 2205, in 600 and 1,073 fathoms (Nos. 39,967 and 39,968).

Cirrhoteuthis plena Verrill, sp. nov.

PLATE XLII, FIGURE 3.

Body broad, thick and short, broadly rounded posteriorly, with the lateral fins inserted well forward, just behind the eyes, their front edges a little behind the gill-opening. The fins are large, thin and broad, with the edges nearly parallel to near the end, which is broadly rounded. The head is as broad as the body and very short. The eyes are relatively small, wide apart, situated in line with the siphon transversely; the lids, in alcohol, are slightly thickened and surround a small elliptical opening. The siphon-tube is small, but prominent and well-developed, expanding to the base. The gill-opening is small and simple, in breadth only slightly exceeding the breadth of the basal part of the siphon.

The arms are long, rather stout, the four upper ones decidedly longer than the four lower, the ventral ones shortest. They are united by a thick, strong web, which, on the upper side between the dorsal arms, extends about two-thirds the length of the arms. It decreases in width between the lateral arms. Between the third and fourth pairs it is about one-half the length of the ventral arms, and between the ventrals about one-third their length. The suckers are rather large for the group, largest at about the basal third, those near the mouth becoming very small. They are arranged rather close together in a single linear series, but sometimes show a slight tendency to become alternate at the basal third of the lateral arms; they are usually separated along the center of the arms by spaces about equal to their own diameter. There are about fifty-five suckers on the dorsal arms, of which about thirty occupy the portion within the web. The tips of the arms, when perfect, are rapidly tapered, rather thin and not much elongated, and bear fifteen to twenty small suckers, which are here nearly in contact. The cirri are rather short, tapered, acute, and usually stand nearly opposite the suckers, forming a row on each side, along the inner face of the arm.

The color of the body and external surface of the web, in alcohol, is a yellowish flesh-color, with a somewhat translucent, gelatinous appearance, with the darker internal organs showing through more or less distinctly. The fins are deep brown, darker towards the tips. The inner surfaces of the arms and web with the cirri, are dark purplish brown, while the suckers are dull brownish yellow.

Total length, 185^{mm}; length of body to gill-opening, 57^{mm}; length to base of ventral arms, 70^{mm}; breadth of body between bases of

fins, 58^{mm}; length of fins, 32^{mm}; their breadth near base, 24^{mm}; total breadth from tip to tip of fins, 130^{mm}; diameter of eye, 12^{mm}; breadth of gill-opening, 12^{mm}; length of siphon, 14^{mm}; length of dorsal arms, 125^{mm}; length of web between dorsal arms, 70^{mm}; length of second pair of arms, 120^{mm}; length of web between dorsal and first lateral arms, 60^{mm}; length of the third pair, 110^{mm}; length of web between third and fourth pairs of arms, 55^{mm}; length of fourth pair of arms, 95^{mm}; breadth of web between the ventral arms, 35^{mm}; diameter of largest suckers, 2·5^{mm}; length of longest cirri, 3 to 4^{mm}.

A single specimen in good condition was taken at station 2205, N. lat. 37° 35′, W. long. 71° 18′ 45″, in 1,073 fathoms, gray ooze, bottom temperature 38° F., August 20, 1884. (No. 39,908.)

Cirrhoteuthis megaptera Verrill, sp. nov.

PLATE XLIII, FIGURES 1, 2.

Body small, very short, depressed, broadly rounded posteriorly, broader than long. Fins very long and narrow, their length considerably exceeding the breadth of the body, in alcoholic specimens; toward the base they are much thickened and supported by an internal cartilage, which does not appear to be continuous with the thin cartilage that extends across the body, just behind the fins. The fins are inserted just behind the eyes, and their breadth is somewhat greater in the middle than at the base; they narrow but little toward the tip, which is obtusely rounded. Head large and broad, exceeding the body in size and thickness in the preserved specimens, the greatest thickness being at the base of the arms. Eyes small, lateral, very far apart, the distance between them being, on the dorsal side, more than twice their diameter. Siphon short, conical, with a broad base. Gill-opening small, simple, only a little broader than the base of the siphon. Arms long, thick and strong, the dorsal ones a little longer than the others, which decrease successively to the ventral pair, which are, however, but little shorter than the third pair. The arms are thick and well rounded, especially on the basal portion, with the inner surface elevated along the median line, on which the suckers are arranged in a simple row; the marginal angles are but slightly indicated, and bear a row of small, slender, tapering cirri, alternating with the suckers, which are very small, urceolate, strongly elevated above the surface of the arms, and of a light yellow color, in strong contrast with the chocolate-brown of the arms. The distance between the suckers along the middle portion of the arm usually

considerably exceeds, and is often double their diameter, but varies with the state of contraction of the arms; at the base of the arms they diminish in size and become more crowded; towards the ends they diminish very gradually, finally becoming very small and closely arranged. The web between the arms is very thick, swollen at the base, and on the dorsal side extends more than half the length of the arms; it is successively a little shorter between the lateral arms, and still shorter between the ventral ones. The color of the body and fins in the alcoholic specimens is bluish white, covered with rather large and irregularly arranged specks and spots of purplish brown. The same color extends more or less on the head, becoming paler and more gelatinous or translucent on the web at the base of the arms, through which the dark brown color of the arms can be distinctly seen. The arms, the outer portion of the web, and its entire inner surface are dark chocolate-brown. The suckers are yellowish white, with brown rims.

Total length, in alcohol, 107^{mm}; length of body to gill-opening, 25^{mm}; breadth of body at base of fins, 20^{mm}; total breadth across outstretched fins, 68^{mm}; length of fins from base to tip, 24^{mm}; breadth across middle, 9^{mm}; at base, 8^{mm}; breadth of head at the eyes, 27^{mm}; across base of arms, 30^{mm}; diameter of eyes, 9^{mm}; breadth of gill-opening, 8^{mm}; length of siphon, 8^{mm}; length of dorsal arms, 95^{mm}; breadth in middle, 6·7^{mm}; diameter of largest suckers, 1^{mm}; length of the longest cirri, 2^{mm}; length of second pair, 85^{mm}; third pair, 80^{mm}; ventral pair, 78^{mm}; extent of web between dorsal arms, 45^{mm}; between first and second pairs, 42^{mm}; between the third and fourth, 32^{mm}. The other specimen of this species has the body and head of nearly the same size, but these parts may be more contracted by the alcohol; the fins and arms are somewhat longer and larger. The length of one of the fins is 33^{mm}; its greatest breadth, 11^{mm}; breadth across eyes, 27^{mm}; diameter of eye, 8^{mm}; diameter of largest sucker, less than 1^{mm}.

The sex of the two specimens described above is uncertain. There is no positive appearance of hectocotylization in any of the arms, but in the specimen first described the left arm of the second pair has a blunt, pale tip, before which the suckers cease abruptly, yet this is most likely due to the early stages of the reproduction of a new tip.

Sketches of this species were made by Mr. A. Baldwin, on the steamer, when the specimens first came up and had some life. From his sketches the figures on plate xliii have been made.

In the living state, according to these and other sketches, the fins

are much larger and broader, with the end more rounded; and the anterior edge is thinner and more convex, than after preservation in alcohol, though the length is not much greater in proportion. The web appears broader, and the arms longer. In one specimen, from station 2224, the body is more elongated behind the fins than in the others, while the long and very broad fins are placed some distance back from the eyes, or about midway between the eyes and the end of the body, and the web does not extend half the length of the arms. It was at first thought that this individual might represent another species, but these creatures are evidently capable of changing their forms and proportions to a great extent, according to the state of contraction of their various parts.

Both the larger specimens of this species have a curious appendage on most, if not all, of the arms. This is a fleshy, tentacle-like process, with a somewhat thickened base, and a tapering, acute tip. It is situated at about the distal third of the arm, on the posterior side, near the edge of the web, and diverges widely from the arm. In one specimen this is present on all the arms of the left side and on two of those on the right side. On the other arms they probably have been destroyed, the arms being injured. The length of this organ is about equal to the breadth of the arms. When perfect these organs, which are muscular, were probably united to the web, and served to support or strengthen it. I am not aware that an organ of this kind has before been observed among the Cephalopods. But it may, perhaps, correspond to one of the transverse supports of the marginal membranes of *Sthenoteuthis* and *Ommastrephes.*

Two specimens (No. 39,963) were taken at station 2,225, N. lat. 36° 05′ 30″, W. long. 69° 51′ 45″, in 2,512 fathoms, on yellow ooze, bottom temperature 37° F.; and two at station 2,224, N. lat. 36° 16′ 30″, W. long. 68° 21′, in 2,574 fathoms, globigerina ooze.

A small specimen, from station 2,220, appears to be a younger stage of this species, with which it agrees, in the small, short body; the narrow, elongated fins, and the comparatively small eyes, as well as in the chocolate-brown color of the inner surfaces of the arms and web; but the external surfaces of the body, web and arms are also strongly colored with deep brown. The arms in this specimen are nearly equal in length, the ventral ones, being a little shorter than the others. The web appears to extend farther toward the tips of the arms than in the larger examples, but this may be due to better preservation. The suckers are small, prominent, and closely arranged.

The total length of this specimen is 43^{mm}; posterior end of body to gill-opening, 13^{mm}; breadth of body at fins, 13^{mm}; length of fins, 9^{mm}; breadth, 4·5^{mm}; breadth of head across eyes, 17^{mm}; diameter of eye, 7^{mm}; from center of eye to tip of dorsal arms, 34^{mm}; to edge of web between dorsal arms, 23^{mm}; to tip of lateral arms, 31^{mm}; to edge of lateral web, 21^{mm}.

Station 2,220, N. lat. 39° 43′ 30″, W. long. 69° 23′, in 1,054 fathoms, (No. 39,916).

This species appears to be closely related to *C. plena* in most respects, but has a very much smaller and shorter body, larger and relatively much longer fins, and the eyes are relatively smaller. The suckers are also smaller, more prominent, and less closely arranged, while the cirri are somewhat longer and more slender. The color of the body and arms is also much darker, and the texture less gelatinous.

Opisthoteuthis Agassizii Verrill.

Supplement to the Cephalopoda of the Blake Exp., p. 113, pl. 1, fig. 1, pl. 2, fig. 1, Bull. Mus. Comp. Zool., vol. xi, No. 6, 1883.

A specimen apparently belonging to this remarkable species was taken at station 2,196, N. lat. 39° 35′, W. long. 70° 03′, in 1,058 fathoms, green mud and stones (No. 39,915). Although in good condition when taken, it was accidentally left too long in sea-water until decomposition had commenced, consequently the greater part of the body and the contained viscera were destroyed. The body seems to have been short and rounded. The lateral fins are narrow, elongated, slightly broadest in the middle, tapered to the blunt tips, with the edges thin. They are situated just behind and in contact with the posterior side of the eyes. The eyes are exceedingly large, occupying nearly the whole breadth of the head, nearly spherical, with the external opening rather large, and with a thin lid on the lower side. The siphon is prominent, elongated, somewhat tapered, and projects backward and upward behind the posterior end of the body. The gill-opening is moderate in size, simple, with a thin, brown margin, and is situated between the siphon and the postero-ventral surface of the body, so that it opens upward and backward, when the creature is in a creeping position. The arms are nearly equal in size and length, not very long, but with slender tips, moderately stout, especially toward the base, well rounded, the inner face without any well-defined margins. The web, as preserved in alcohol, extends

about half the length of the arms, and is nearly equal all around, but is, perhaps, a little broader between the dorsal arms. The suckers are small, yellowish white, a little prominent, arranged rather closely in a single median row. The largest ones are near the base of the arms, about the fifth to the eighth from the base; beyond these they decrease regularly to the tips of the arms, where they become small and close. The cirri are rather small, tapered, acute, placed alternately with the suckers and not very far from them, the interval being about equal to the diameter of the suckers; they commence between the fifth and sixth suckers, and apparently continue to the tips of the arms, becoming gradually very small. On each of the arms there are thickened muscular appendages, similar to those of the preceding species, but shorter and broader. They arise from the posterior face of the arm, nearly at right angles, at the point near where the interbrachial web joins (or becomes) the marginal membrane of the arm, and are closely united to the web, apparently serving to strengthen it. Their length is about equal to the breadth of the arm.

The color, so far as preserved in alcohol, is deep chocolate-brown on the inner surface of the arms and web, with a median band of somewhat darker brown occupying the inner face of the arms. On the upper surface of the web, head, and body the color is destroyed, but it appears to have been brown.

Length of longest arms, 66 to 70^{mm}; breadth of arms near base, 7^{mm}; breadth of head across eyes, 26^{mm}; diameter of eyes, 14^{mm}; length of fins, 11^{mm}; breadth, 6^{mm}; length of arms from edge of intermediate web, 35^{mm}; diameter of largest sucker, 1^{mm}; length of cirri, 2^{mm}.

Stauroteuthis syrtensis Verrill.

Amer. Journ. Sci., xviii, p. 468, 1879, Trans. Conn. Acad., v, p. 382, pl. 32, figs 1—5, 1881; vi, p. 249, 1883.

A small specimen, apparently identical with this species, was taken at station 2,180. In this the body is small, narrow, somewhat elongated or ovate in form, while the arms are very much elongated, with a very broad, loose web extending nearly to the end. The cirri are very long and slender, thread-like. The suckers are rather small, little elevated, and wide apart. The fins are relatively large, broadest at the base, which is placed well forward, lanceolate in form, tapering toward the end, which is blunt. The eyes are moderately large,

not very far apart, the head being narrower than in most of the related forms. The gill-opening is a small, rounded pore, with a thickened margin, situated about opposite the eyes. The siphon is not visible; it may have been broken off, or may be retracted. The whole texture is extremely soft and gelatinous. The color of the external surfaces is translucent dull bluish gray; the inner surfaces of the arms are tinged with chocolate-brown.

The total length is about 125^{mm}; posterior end of body to gill-opening, 20^{mm}; breadth of body at fins, 14^{mm}; breadth across eyes, 14^{mm}; diameter of eyes, 6^{mm}; length of fins, 12^{mm}; breadth at base, 9^{mm}; length of longest arms from center of eye, 107^{mm}; to edge of web, 74^{mm}; length of cirri, about 10^{mm}.

Station 2,180, N. lat. 39° 25′ 50″, W. long. 71° 49′ 30″, in 523 fathoms, bottom temperature, 39° F. (No. 39,965).

Eggs of Cirrhoteuthis or Stauroteuthis.

Very peculiar eggs, belonging to cephalopods of this group, have often been dredged by us in deep water. They are usually attached to the stem or branches of *Acanella Normani* or other gorgonians. Similar eggs were often found attached to the same corals brought in from the deep water of the northern fishing banks by the Gloucester halibut fishermen, since 1879. None of these contained embryos sufficiently developed to render their identification possible, until some were dredged last summer, at station 2209, in 1,080 fathoms (No. 39,961), containing well-formed embryos, so far developed as to show that they belong to *Cirrhoteuthis* or some closely allied genus. These embryos have a well-developed body, rounded behind, with relatively large, rather broad lateral fins, having the outer ends broadly rounded, situated far forward and as long as the breadth of the body. The eyes are relatively large and prominent, or somewhat stalked. The arms are slender, rounded, with a simple close median row of small suckers. The web is but little developed, the arms being free nearly to the base. The siphon-tube is prominent and the gill-opening is simple and small, but relatively larger than in *Stauroteuthis syrtensis*. It is probable, therefore, that this embryo belongs to one of the species of *Cirrhoteuthis* described above. The eggs may belong to more than one species, but show no tangible external differences.

These eggs are contained in a strong but flexible case, about an inch long, elliptical in form, but often somewhat irregular on the

sides that are attached to the coral-branches which are usually so deeply imbedded that they seem to pass through the side of the case. The inner surface of the case is smooth, but the outer surface is more or less rough and uneven, and usually covered with a thin adherent coat of greenish mud. The egg itself is much smaller than the interior of the case. It is covered with a firm, smooth, transparent shell. The form is usually a pretty regular ellipsoid, sometimes varying to ovate. The color is orange or salmon.

The egg-cases are from 20^{mm} to 26^{mm} long; 14 to 17^{mm} broad. The eggs in alcohol are 15^{mm} long; diameter, 12^{mm}. Another one is 16^{mm} long; 11^{mm} in diameter.

These eggs have been dredged at stations 2051, 2072, 2205, 2209, 2210, 2212, and in other localities, in 428 to 1,106 fathoms.

GASTROPODA.

Pleurotomella Jeffreysii Verrill, sp. nov.

PLATE XLIV, FIGURE 3.

Shell rather large, elongated fusiform, with a tall, acute, turreted spire, consisting of about seven whorls besides the nucleus, which contains about four brown whorls. The whorls have a rather conspicuous shoulder, below which they are flattened, but above it they have a broad, sloping, decidedly concave, subsutural band. The suture is distinct, but not at all impressed, owing to the flattening of the whorls. The sculpture consists of a row of prominent, oblique, elongated nodules at the shoulder; those on the upper whorls relatively more prominent and angular than on the lower ones; these nodules are continued downward in the form of slightly raised, obliquely curved ribs, which extend nearly across the upper whorls, but fade out a short distance below the suture on the lower ones. The whorls are also crossed by distinct lines of growth which curve strongly forward on the middle of the last whorl and recede in a strong regular curve on the subsutural band, where they are numerous and fine, but on the upper whorls part of them become more prominent near the suture. The whorls below the shoulder are also covered with numerous, impressed, regular, revolving grooves, separated by intervals of somewhat greater width; these revolving furrows are crossed by the lines of growth in such a way as to make them wavy or crinkled. The revolving lines are mostly absent above the

shoulder. The nucleus, which consists of four whorls, is chestnut-brown in color, large, regularly tapered, very acute, the apical whorl being very minute, but regularly coiled; the three lower nuclear whorls are very minutely decussated by two sets of very fine, oblique lines. The aperture is long, rather narrow, with the posterior end acutely angled; the siphon is nearly straight, rather long and narrow. The columella is nearly straight; the outer lip curves strongly forward in the middle and has a rather broad and deep, rounded sinus situated a little below the suture.

The entire shell below the nucleus is translucent bluish white in live specimens, and the surface is lustrous.

Length of the largest specimen, 52mm; breadth, 18mm; length of last whorl in front, 36mm; length of aperture, 27mm; its greatest breadth, 8mm; length of nucleus, 2mm.

The largest specimen, which was dead, occurred at station 2,230, in 1,168 fathoms (No. 44,650); a smaller, living specimen (No. 44,649), was taken at station 2,222, in 1,537 fathoms.

This fine species is named in honor of Mr. George Gwyn Jeffreys, the distinguished conchologist.

Pleurotomella tincta Verrill, sp. nov.

PLATE XLIV, FIGURE 4.

Shell moderately large, somewhat stout, nearly regularly fusiform, rather thin, delicate and translucent in texture, in the living specimens having a light chestnut-brown color and a lustrous surface. The spire is rather short, rapidly tapered, acute. The largest specimen consists of five whorls besides the nucleus, which apparently contains about two and one-half whorls, but is eroded in both of our specimens.

The whorls of the spire have a distinct, nodulous shoulder and a broad, sloping, concave subsutural band, occupying about one-half the breadth of the whorls; on the last whorl the shoulder is convexly rounded and destitute of nodules, but is crossed by numerous, distinct, flexuous lines of growth which rise into distinct, sharply raised riblets on the subsutural band just below the suture; the surface is also covered, except on the subsutural band, by numerous small, regular, sharply impressed grooves, which appear a little wavy or crinkled, owing to the crossing of the lines of growth; the grooves are separated by smooth, flattened interspaces exceeding their own width. On the preceding whorls the nodules on the shoulder are

prolonged downward obliquely in the form of small riblets, which, on the subsutural band, become strongly excurved, thinner and more sharply raised; these whorls are also sculptured by a few, distinct, raised, spiral lines, both below the shoulder and on the lower part of the broad subsutural band. The nucleus appears to have been regularly tapered and finely cancellated, but is eroded in both specimens. The aperture is rather large, elongated, fusiform, with an acute posterior angle and a short, straight canal a little constricted at the base; the columella is nearly straight, with its edge only slightly sinuous.

The color of the shell within is dull flesh-color, with a patch of brown on the columella; externally the color is brownish salmon or pale chestnut-brown.

Length of the largest specimen, 22^{mm}; greatest breadth, 11^{mm}; length of body-whorl in front, 17^{mm}; length of aperture, 14^{mm}; greatest breadth, 4^{mm}.

The living specimen (No. 44,652), described above, was taken at station 2,225, in 2,512 fathoms, N. lat. 36°, 05′, 30″; W. long. 69°, 51′, 45″. A smaller, dead specimen (No. 44,651), occurred at station 2,224, in 2,574 fathoms.

This species bears considerable resemblance to *P. Emertoni* V. in form and general appearance, but differs very decidedly in color and the details of its sculpture.

Pleurotomella Frielei Verrill, sp. nov.

PLATE XLIV, FIGURE 5.

Shell of moderate size, rather thick and solid, elongate-ovate or subfusiform, with a rather long, regularly tapered spire, consisting of about six whorls below the nucleus, which is small and consists of two or more whorls, eroded in our specimens. The whorls of the spire are a little convex and slightly angulated or shouldered just above the middle, and have a rather broad, slightly concave subsutural band; the last whorl is more evenly convex and the shoulder is rounded and rather indistinct.

The surface is covered with numerous rather fine, flexuous riblets, parallel with the lines of growth; these curve forward on the middle of the whorl below the shoulder, but are strongly excurved in crossing the subsutural band, and become thin and more prominent just below the suture, which is distinctly impressed. The surface is also covered with very numerous thin, revolving cinguli, which are sepa-

rated by intervals of about the same width; these extend over the subsutural band, but are there a little less prominent; on the convex part of the whorls they are wavy and irregularly decussated by the lines of growth; on the spire the two sets of lines produce a cancellated structure. The aperture is short and rather broad, with an acute angle posteriorly and a short, broad, straight canal in front; the columella is short, nearly straight, with the inner edge strongly sinuous and obliquely cut away at the end. The inner lip is strongly excavated at the base of the columella; the outer lip is regularly curved, except above the shoulder, where it is slightly flattened and sloping; in the middle it projects considerably forward in a broad curve, but the posterior sinus is broad, rather deep, well-rounded, and deepest just above the shoulder.

Color, grayish or yellowish white externally, bluish white within; in one specimen with a conspicuous reddish brown patch on the columella margin.

Length, 22^{mm}; greatest breadth, 10^{mm}; length of body-whorl, in front, 15^{mm}; length of aperture, 11^{mm}; breadth of aperture, 5^{mm}.

Two living specimens (No. 44,653), were taken at station 2,208, in 1,178 fathoms, N. lat. 39° 33′; W. long. 71° 16′ 15″.

This species is named in honor of Mr. Herman Friele, the able conchologist of the Norwegian Arctic expeditions.

Pleurotomella vitrea Verrill, sp. nov.

PLATE XLIV, FIGURE 6.

Shell small, thin, delicate, translucent bluish white, rather stout, fusiform, with angular whorls and an acute spire. Whorls four and one-half, besides the nucleus, which is small, acute and consists of about three chestnut-brown whorls. The whorls of the spire are angulated and somewhat carinated at about the middle, where there is a band of angular tubercles. The subsutural band is broad, sloping, flattened or sometimes distinctly concave, and occupies more than half the breadth of the whorls.

The sculpture consists of about twelve to fourteen oblique, somewhat angular and prominent transverse ribs, separated by broader, concave intervals, rising at the shoulder into small angular tubercles, on the subsutural band becoming much smaller and strongly excurved in the middle, like the lines of growth, and rising into small, sharp lamellæ just below the suture. The surface is also covered with very distinct, raised, revolving cinguli, separated by

intervals usually considerably exceeding their breadth, but becoming narrower at the base of the canal, much smaller and less distinct on the subsutural band and usually absent on its upper part. On the lower whorls of the spire there are usually about four of the larger revolving cinguli, of which the uppermost forms the carina at the shoulder; they cross alike the ribs and their intervals, often rising into little tubercles in crossing the ribs. The nucleus is small, regularly tapered, very acute, the first whorl being very minute; its whorls are minutely reticulated by two sets of fine, oblique lines. The aperture is fusiform, with an acute posterior angle and a strongly excavated inner margin; the outer lip is thin, somewhat angulated at the shoulder, with a broad, shallow sinus just above it. The canal is a little elongated, tapered, slightly constricted at its base by the slight incurvature of the outer lip. The columella is nearly straight, with a strongly sinuated inner margin. The surface is lustrous and the texture somewhat vitreous, with a bluish white tint. There is no operculum.

Length, 8^{mm}; breadth, 5^{mm}; length of aperture, 5^{mm}; its breadth, 2^{mm}. A somewhat more slender specimen measures in length, 9^{mm}; in breadth, $4{\cdot}6^{mm}$; length of body-whorl, 7^{mm}; length of aperture, $5{\cdot}5^{mm}$; breadth, $2{\cdot}3^{mm}$.

Station 2,212, in 428 fathoms, one living specimen (No. 44,654); station 2,213, in 384 fathoms, two living specimens (No. 40,472).

This delicate species has a general resemblance to several others of this genus, such as *P. bandella* Dall., *P. Sandersoni* V., and the young of *P. Agassizii*, but it differs from all these in its more delicate texture, greater transparency, and small, very acute nucleus, as well as in the details of its sculpture. Its subsutural band is unusually broad, and the whorls are decidedly angulated in the middle.

Pleurotomella Lottæ Verrill, sp. nov.

PLATE XLIV, FIGURE 7.

Shell small, short, ovate-fusiform, moderately stout, with slightly shouldered, convex whorls, and a regularly tapered, acute spire. Suture shallow, but well-marked. Whorls about four and one-half, besides the large nucleus, which consists of about three and one-half gradually increasing whorls. The whorls of the spire are obscurely shouldered at about the middle, above which the broad, sloping subsutural band is slightly concave.

The sculpture on the penultimate whorl consists of about six elevated, rounded, revolving cinguli, with some much finer intermediate

ones; some of the smaller cinguli are also found on the subsutural band. The transverse sculpture consists of fine, slightly flexuous lines of growth, crossing both the cinguli and their intervals, and on the subsutural band becoming more prominent in the form of oblique, recurved riblets, which do not take the form of nodules. On the last whorl the revolving cinguli continue at about uniform distances over the entire whorl and canal, but anteriorly the cinguli thicken and are wider than the grooves, while on the convex part of the whorl they are narrower than the intervals.

The aperture is broad-ovate, rather large, acute posteriorly; the outer lip is thin, strongly convex in the middle, with a broad and shallow posterior sinus above the shoulder. The canal is short, straight, not contracted at the base. The columella is straight in the middle, with an oblique anterior edge; the inner margin of the aperture is strongly excavated and subangular at the base of the columella. Umbilicus none. The animal is destitute of an operculum.

The nuclear whorls are deep chestnut-brown, very minutely reticulated by oblique lines running in two directions. The whorls are regularly convex, the apical ones minute and a little prominent, so that the apex is acute.

Color of the shell below the brown nucleus translucent bluish white, with a somewhat glossy surface; when dead, yellowish white.

Length of the type-specimen, 11^{mm}; breadth, 7^{mm}; length of body-whorl and canal, $7{\cdot}5^{mm}$; length of aperture, 6^{mm}; its breadth, $2{\cdot}8^{mm}$. Another somewhat larger and stouter specimen is $11{\cdot}5^{mm}$ long; breadth, $7{\cdot}5^{mm}$; length of body-whorl and canal, 8^{mm}; length of aperture, $6{\cdot}3^{mm}$; its breadth, $3{\cdot}8^{mm}$.

Station 2,221, N. lat. 39° 05′ 30″, W. long. 70° 44′ 30″, in 1,525 fathoms; two specimens (No. 40,498).

This shell bears little resemblance to any of our other species except *P. Bruneri*. It differs from the latter in having a higher and more acute spire, with the whorls less strongly shouldered and the subsutural band much less convex; the canal is shorter; the aperture relatively broader, and the inner margin more excavated at the base of the columella; the spiral cinguli are fewer, stronger, more prominent, and more sharply cut; the transverse lines are less strongly recurved in crossing the subsutural band, but become more prominent close to the suture; the posterior sinus of the lip is much shallower and less distinct; the nucleus is similar in the two forms, but is a little more acute in the present species. From all the other species it differs so widely that no detailed comparison is necessary.

This beautiful and delicate species is named in honor of Miss Charlotte E. Bush, one of the excellent assistants who have aided me in my work on the conchological collections of the U. S. Fish Commission.

Gymnobela brevis Verrill, sp. nov.

Shell small, short, stout, with a short, turreted spire, having squarely shouldered lower whorls. The nucleus is eroded in all of our specimens, but apparently consist of three whorls, which rapidly enlarge, the third having its surface covered with regular spiral lines crossed by slight thin ribs; on the next whorl the revolving lines become more prominent, about four of them situated below the shoulder, which is sloping, and one or two above it; these are crossed by longitudinal ribs of about the same size, producing a decussated structure. On the last whorl the spiral lines become thicker and stronger and the ribs become stouter, more elevated and obtuse, separated by wider intervals, and run down somewhat obliquely and fade out at about the middle of the whorl; the spiral lines form minute nodules in crossing the ribs; above the shoulder, which is strongly angular, the ribs are thin, only little raised, and bend obliquely forward without much curvature on the subsutural band, which rises abruptly from the suture, sloping but little, and is somewhat concave in the middle and a little swollen close to the suture.

The aperture is short and broad, angulated at the shoulder, strongly excurved at the base of the columella, which is short and straight, with a strongly sinuous inner margin; the posterior sinus is broad, shallow and inconspicuous. The canal is very short and broad, not constricted, rounded at the end. Color, white.

Length, 8^{mm}; breadth, $5{\cdot}5^{mm}$; length of body-whorl, 6^{mm}; length of aperture, 5^{mm}; its breadth $2{\cdot}20^{mm}$.

Station 2,041, in 1,608 fathoms, one specimen (No. 34,838); and station 2,084, in 1,290 fathoms, 1883. Station 2,229, in 1,423 fathoms, 1884.

Bela Blakei Verrill, sp. nov.

PLATE XLIV, FIGURE 8.

Shell of good size for the genus, stout, fusiform, with turreted spire and shouldered whorls, having a circle of nodules just below the suture and another at the shoulder. Whorls about five and a

half, of which three belong to the nucleus, which is rather large, regularly coiled, the apical whorl rather small, a little depressed, white and polished; the second whorl is also polished, but crossed by very fine lines of growth; the last nuclear whorl has about five raised, revolving cinguli in addition to the lines of growth.

The lower whorls are crossed by numerous rather straight, obtuse ribs, separated by intervals of about their own breadth; of these there are about twenty-four on the last whorl. Each of these ribs rises into a rounded, rather prominent tubercle at the shoulder; they are faintly marked and oblique on the concave subsutural band, but form another circle of obtuse tubercles just below the suture; anteriorly they fade out at about the middle of the body-whorl. The suture itself is impressed and undulated. The surface, both of the ribs and intervals, is covered by close but distinct lines of growth. At the shoulder a distinct revolving carina connects the tubercles together; below this there are pretty regular, well-developed revolving cinguli, which are rounded and separated by rather wide intervals, and cross both ribs and interspaces, but in crossing the ribs they become more prominent and form oblong nodules on the upper part of the whorl; on the lower part of the whorl and siphon they are a little wider, more spaced, and roughened only by the raised lines of growth. On the penultimate whorl there are three or four revolving cinguli below the carina. The subsutural band is strongly marked, broad and decidedly concave, and is covered with slightly curved, oblique lines of growth and faint ribs, and has a single, small, revolving cingulus in the middle. The aperture is long, ovate-fusiform, angulated at the outer lip, and with an acute posterior angle; anteriorly it is narrowed into the moderately long straight canal; the posterior sinus is nearly obsolete. Columella straight, with a sinuous inner margin. Operculum greenish yellow, ovate, obtusely rounded posteriorly, subspiral anteriorly, with the nucleus near the inner anterior edge. Epidermis pale yellow, thin, closely adherent. Color of the shell within, bluish white; nucleus white.

Length, 16^{mm}; breadth, 8^{mm}; length of body-whorl in front, 7^{mm}; length of aperture, 5^{mm}; its breadth, $3{\cdot}5^{mm}$; length of operculum, $4{\cdot}5^{mm}$; its breadth, 3^{mm}.

A single living specimen (No. 44,655), was taken at station 2,226, in 2,021 fathoms, N. lat. 37° 00′, W. long. 71° 54′.

This fine species has some resemblance to the northern *B. scalaris*, but has a finer and more regular sculpture, and is easily distinguished by the distinct circle of nodules just below the suture, a peculiarity

which is also found in many species of *Pleurotomella*. The character of the nucleus and the presence of an operculum shows that this is a true *Bela*.

This shell has been named in honor of Mr. J. H. Blake, who was a member of the U. S. Fish Commission Party in 1874, 1875 and 1884.

Bela tenuicostata G. O. Sars.

Moll. Arcticæ Norvegiæ, p. 237, pl. 17, figs. 1, *a*, *b*, pl. ix, fig. 6 (dentition), 1878.

This species occurred living at station 2076, in 906 fathoms; station 2084, in 1,290 fathoms, one living specimen (No. 35,179); and at station 2115, in 843 fathoms, one living example (No. 35,595).

These appear to be in all respects like the European form, which is, apparently, a valid species, belonging to the deep sea fauna. The form referred by me in the first Catalogue Marine Mollusca (these Trans., v, p. 481), to this species, which was then regarded by me as a variety of *B. decussata*, is coarser in sculpture, and is doubtless a variety of the latter.

The true *B. tenuicostata* now recorded is remarkable for its delicate texture and fine reticulated sculpture.

Admete nodosa Verrill and Smith, sp. nov.

PLATE XLIV, FIGURE 9.

Shell rather small, thick and solid, short, stout, with coarsely ribbed and rudely nodulous, convex whorls. The spire is short and rapidly tapered, with the apex apparently blunt, but eroded in both of our specimens. Whorls apparently four to five; the last two whorls are strongly convex with a well impressed suture. The last whorl is surrounded by five rows of rather large and coarse, prominent nodules, joined together by low, revolving ridges and situated upon about twelve, broad, low, rounded or wave-like ribs. On the penultimate whorl the ribs are more prominent and continue across the whorl and bear about three rows of nodules. The aperture is short, broad-ovate, more acute behind than in front; the canal is very short and broad flaring, widely opened and twisted a little to the left, but does not cause any interruption or constriction of the outer lip which is regularly arched, forming nearly a semi-circle and has a thin flaring edge which is strongly thickened a short distance within the aperture, anteriorly the outer lip continues round in a regular curve and joins the columella without a distinct notch; posteriorly there is a distinct rounded groove within the aperture at the

junction of the lip with the body-whorl; the columella is strongly sinuous and twisted, its anterior margin forms a distinct ridge or fold and another similar fold is situated at about the middle; the inner lip is excavated in the middle and is thickened by a layer of white enamel, which is continuous from the outer lip around to the anterior margin. There is no operculum. Color white.

Length, 12^{mm}; greatest breadth, 8^{mm}; length of body-whorl in front, 10^{mm}; length of aperture, 7^{mm}; its breadth, 4^{mm}.

A living specimen (No. 44,646), was taken at station 2,234, in 816 fathoms, N. lat. 39° 09′, W. long. 72° 03′ 15″. Another specimen, but dead, was taken at station 2,217, in 924 fathoms.

The last named specimen differs from the type in having the nodules smaller and less prominent on the last whorl, while there are six distinct but not very prominent revolving ridges; but the ribs and nodules are sufficiently prominent on the preceding whorls.

This species is remarkable for its solidity and the coarseness of its ribs and nodules. It can easily be distinguished from all our other shells by the character of the aperture, and especially by the columella-folds.

Marginella Virginiana Verrill, sp. nov.

Shell very small, rather slender, fusiform, with an elevated spire, composed of three to four whorls, regularly tapered, with a subacute tip, formed by a small, rounded, prominent nuclear whorl. Suture distinct. Body-whorl elongated, fusiform, with the basal part much tapered. Aperture small, oblique, narrow behind, wider in front, canal a little expanded at the tip. Outer lip thickened within and without, usually a small denticle stands close to the posterior sinus. Pillar with four thin prominent folds, the posterior one nearly transverse; the anterior very oblique. Surface and somewhat polished.

The color is plain, but varies from grayish or yellowish-white to cream-color and pale chestnut-brown, rarely slightly flecked or faintly banded with lighter and darker tints.

The largest example from station 2307, in 43 fathoms, is 5^{mm} long; breadth, 2·6^{mm}; length of aperture, 3^{mm}. Many specimens are more slender than this. A small one from station 2265, is 2^{mm} long; breadth, 1^{mm}.

This species occurred in considerable numbers at station 2272, off Cape Hatteras, in 15 fathoms (No. 44,834); also at station 2307, in 43 fathoms; and at station 2265, off Chesapeake Bay, in 70 fathoms, one example.

Trophon abyssorum Verrill, sp. nov.

Trophon clavatus Verrill, these Trans., vi., p. 176, 1884 (*non* Sars).

Shell rather small, stout-fusiform, with strongly angulated whorls and a long, slender, straight canal. The spire consists of three or four whorls besides the nucleus, which is rather large, consisting of about two prominent, smooth whorls. Below the nucleus the whorls are strongly shouldered a little above the middle, the carination of the shoulder being sharply angulated and usually surmounted by a circle of strong, acute, hollow spines, usually eight to ten in number, which sometimes project at right angles, but frequently curve upward more or less strongly. The suture is impressed and the upper slope of the whorl rises rather abruptly from the suture and is usually flattened and somewhat concave near the shoulder, but sometimes a little convex; below the shoulder the whorl slopes rapidly to the suture. The last whorl is large and convex below the shoulder, and slopes rapidly to the base of the canal, which is long, narrow, nearly straight, but often a little upturned near the tip. The sculpture consists of more or less distinct lamellæ, corresponding with the lines of growth, and at the shoulder forming the prominent spines. Sometimes the lamellæ are prominent and distinct entirely across the whorls, and to the base of the canal on the body-whorl, in other cases they are nearly obsolete except close to the spines. The aperture is elongated, strongly angulated at the shoulder of the last whorl and constricted anteriorly at the base of the canal.

The color is translucent bluish white in alcohol, with the nucleus sometimes pale flesh-color.

Length of a medium sized example, 8^{mm}; breadth, including spines, 5^{mm}; not including spines, $3{\cdot}5^{mm}$; length of aperture, 5^{mm}; its breadth, $1{\cdot}5^{mm}$; length of canal, $2{\cdot}5^{mm}$.

Variety, **limicola** Verrill, nov.

In this variety the transverse lamellæ on the whorls are more numerous and much closer together, but in crossing the shoulder they do not form spines of so large size, frequently rising into sharp scales or small spinules, but at other times they assume the character of spines, more nearly approaching the form already described. The number of lamelliform ribs amounts frequently to eighteen or twenty. In shape the shell is very nearly like that of the typical form with the canal long, narrow and pinched up at the base, but the aperture is more rounded externally, owing to the less angulated shoulder.

The nucleus appears to be a little larger and more prominent than in the other form. Some of the specimens of this variety are larger than the typical ones. One of the largest measures 11^{mm}; breadth without spines, 5^{mm}; length of aperture, 7^{mm}; of canal, 4^{mm}.

This variety might readily have been taken for a distinct species if intermediate forms had not occurred. Both varieties have been dredged in many localities, in considerable numbers, and many intermediate forms have been met with. The less spinose forms generally come from the deeper waters, but in some cases both forms occur together.

This species ranges in depth from 843 to 2,033 fathoms. It was taken at ten stations in 1883, and at five stations in 1884. The typical form was most abundant at station 2115, in 843 fathoms, where over forty specimens occurred (No. 35,583), and at station 2076, in 906 fathoms, over twenty specimens (No. 38,041). Variety *limicola* occurred most abunbantly at station 2221, in 1,525 fathoms, where nearly one hundred specimens were taken, alive and dead; and at station 2038, in 2,033 fathoms, twenty specimens (No. 34,847); the largest example of this variety occurred at station 2084, in 1,290 fathoms (No. 38,039).

This species resembles *T. clavatus* G. O. Sars, to which I formerly referred it, but both Dr. H. Friele and Mr. Gwyn Jeffreys, to whom I afterwards sent specimens, considered it a distinct species.

Jumala brychia Verrill and Smith, sp. nov.

PLATE XLIV, FIGURES 10, 10a.

Shell rather slender, elongated, fusiform, with a tall tapering spire, consisting of more than seven whorls (apex eroded). The body-whorl is somewhat swollen and much larger than the preceding. The lower whorls are slightly shouldered; the upper ones distinctly so. Below the shoulder the lower whorls are somewhat flattened, but distinctly convex, while the upper whorls are distinctly angulated at the shoulder and scarcely convex below it. On the body-whorl the sculpture consists of well-marked, distinctly raised, revolving cinguli, separated by intervals about twice as wide, one or two of those at the shoulder being a little more prominent than the rest, while above the shoulder they are fewer and less distinct. On the upper whorls the cinguli are more prominent, one at the shoulder forming a distinct carina, above which there are six or eight somewhat smaller ones, while one quite prominently developed is situated

just below the suture. The upper whorls are also crossed by numerous, regular, nearly straight, narrow, longitudinal ribs which, with the revolving lines, produce a cancellated structure and at the shoulder they rise into small, rounded nodules, and form another row of smaller nodules in crossing the subsutural line. On the lower whorls the ribs disappear or become indistinguishable from the lines of growth which cover the whole surface. The aperture is narrow-elliptical; the outer lip is regularly arched, except at the shoulder, where it is slightly angulated; the columella is excurved and has a distinct, oblique spiral fold at about the middle; the canal is very short, broad and open, without any constriction. The shell is translucent bluish white internally. The epidermis is pale, yellowish green, thin, firm and close, a little roughened by the fine lines of growth. The operculum is well-developed, but smaller than the aperture, elongated and irregularly ovate, nearly straight on the outer margin, convex on the inner, bluntly rounded posteriorly, terminating anteriorly in a narrow point, which is slightly falcate, but not spiral; color yellowish green.

Length of the shell (consisting of only the five lower whorls), 41^{mm}; the eroded apical whorls may have been 4 or 5^{mm} additional; greatest breadth, 37^{mm}; length of body-whorl in front, 20^{mm}; length of aperture, 22^{mm}; its breadth, $8{\cdot}5^{mm}$; length of operculum, 13^{mm}; breadth, 6^{mm}.

A single living specimen was taken at station 2224, in 2,574 fathoms, N. lat. 36° 16′ 30″, W. long. 68° 21′ 00″. (No. 44,647.)

This species appears to be related to *J. Ossian-Sarsii* Friele. It is at least probably congeneric with the latter, but is a much more slender and delicate shell and quite different in its sculpture and form.

Omalaxis nobilis Verrill, sp. nov.

PLATE XLIV, FIGURE 12.

Shell strong, coiled closely in a flat spire, which is nearly plain on the upper or right hand surface and strongly concave on the left or base. The shell consists of five visible whorls, the apical whorl being small and concealed by the succeeding one. The whorls are strongly angulated, nearly quadrangular, with two strong, prominent, rounded carinæ at the periphery, one at each angle, the upper one somewhat more prominent than the other. The surface of the periphery, between these carinæ, is concave and sculptured by several small, spiral ribs, one of which, next the upper carina, is double, while two or

three are near the lower carina, leaving a comparatively smooth, depressed central area around the periphery; small spiral lines also appear on the surface of the large carinæ. The upper surface of the whorls is nearly flat and distinctly depressed below the level of the outer carina, which is often made double by a groove on its upper side; close to the suture there is also a slightly raised spiral ridge rising abruptly from the suture, which is narrow but distinct. The double peripheral carina appears on the preceding whorls close to the suture. On the lower side the whorl is strongly depressed next the outer carina and then slopes inward with a slightly convex surface, which is covered with fine spiral striæ, and has a slightly raised spiral ridge near the inner angle; this ridge and also the outer carina are visible on the whorls within the broad umbilical depression; the nuclear whorls appear to be smooth so far as they are visible. The whorls are crossed by very distinct, close, raised lines of growth, which become prominent and form transverse nodules in crossing the principal carinæ, but are elsewhere fine and close. On some parts the remnants of the epidermis can be seen, which appears to have been raised into fine lamellæ along the lines of growth. The aperture is four-sided and somewhat trapezoidal, with the outer corners squarely angled and the inner ones rounded; the outer side is flattened, while the inner side is pretty well rounded. The operculum is thin, horny, multispiral, somewhat concave and dark brown in color. The color of the living shell is pale chestnut-brown, irregularly and indistinctly banded with yellowish white.

Greatest diameter, 11^{mm}; height, or breadth of last whorl, 3^{mm}; diameter of aperture, $2{\cdot}5^{mm}$.

One living and one dead specimen occurrred at station 2265, off Chesapeake Bay, in 70 fathoms (No. 41,481).

Delphinula nitida Verrill and Smith, sp. nov.

PLATE XLIV, FIGURE 11.

Shell small, fragile, very delicate, with a slight silvery iridescence.

Our specimen, which has lost the apex, consists of three gradually enlarging whorls entirely disconnected with each other and nearly round in a cross section. When perfect the spire, must have been rather elevated, gradually tapering to an acute tip. The surface is sculptured by thin, elevated riblets, crossed by distinctly raised, revolving lines of about the same size, producing a pretty regularly cancellated or reticulated sculpture, in which the meshes are mostly elongated in the direction of the spire, around the periphery, but in

the opposite direction on the lateral and inner surfaces; the transverse riblets are most elevated on the upper sides of the whorls, where they rise into small, thin lamellæ; they also form similar lamellæ on the inner and lower surfaces; the revolving lines are most conspicuous around the periphery; minute but distinctly raised lines of growth also cross the intervals between the riblets. In a front view of the base the shell appears umbilicated and the upper whorls can be partially seen within the umbilicus. Color silvery white, slightly iridescent.

Length (including only the three last whorls), 5^{mm}; breadth, 4^{mm}; diameter of aperture, $1{\cdot}6^{mm}$.

Station 2229, in 1,423 fathoms, one dead but fresh specimen. (No. 44,648).

This singular shell bears no resemblance to any other known from this region. The soft parts and operculum being unknown, it is referred to this genus only provisionally, but its form and the pearly structure of the shell indicate that this is probably its proper place.

Margarita, sp. nov.

A broken specimen of a large and handsome species was taken at station 2265, in 70 fathoms, off Chesapeake Bay. The shell is moderately elevated, with rather convex whorls and a narrowly canaliculate suture. The umbilicus is deep and moderately large, crenulated within by several spiral ribs. On the outer and lower surfaces of the whorls there are several sharply cut, elevated spiral cinguli, with deep furrows between. These are crossed by strong, oblique, raised lines of growth, which produce small nodules on the upper ones, and above the shoulder take the form of oblique riblets, running down from the suture. The upper whorls are broken off.

Puncturella abyssicola Verrill, sp. nov.

Shell moderately large, elliptical or ovate in outline, a little narrowed anteriorly, evenly convex along the sides, and rounded posteriorly, moderately elevated, with the apex small, not very prominent, acute and curved backward and inward, situated a little behind the middle. The posterior slope is at first a little concave, owing to the position of the beak; the anterior slope is gently convex. The foramen is elongated fusiform, broadest in the middle, tapering both ways to acute points, but most acute anteriorly; its posterior end does not reach the vertex, and terminates some distance from the

apex; it is thickened and partially filled up within. A slightly elevated ridge runs from the anterior end of the opening to the front edge of the shell, but is scarcely larger than the other ribs. The sculpture consists of about forty rounded, moderately elevated, nodulous, radiating ribs, with an alternating series of similar but smaller ribs on the lower half. The surface is covered with concentric, raised lines, which are nearly as prominent as the radii, producing a cancellated structure and forming the small, rounded nodules where they cross. The internal septum is highly developed, large, strong and tubular, extending down in front farther than the foramen, with narrow lateral ridges extending nearly to the front edge of the shell. The edge of the shell is thin and slightly crenulated by the ribs.

Length, 10^{mm}; greatest breadth, 7^{mm}; height, 5^{mm}; anterior edge to apex, 8^{mm}; posterior edge to apex, $4{\cdot}5^{mm}$; length of foramen, $1{\cdot}6^{mm}$.

One dead specimen was taken at station 2222, N. lat. 39° 03′ 15″, W. long. 70° 50′ 45″, in 1,537 fathoms, gray ooze, with pebbles, concretions and cinders.

This species differs from *P. noachina* in being much less elevated, with the sides not flattened; in having the apex less prominent and farther back; in the distinctly and rather coarsely cancellated structure; and in having a broader and more fusiform foramen, situated more anteriorly and not extending so far toward the apex; the internal septum is larger and more flattened and prolongations extend from its anterior edges nearly to the anterior edge of the shell. It seems to be very distinct from all the species described by Watson, Jeffreys, and Dall.

Cocculina reticulata Verrill, sp. nov.

Shell small, high, with a short-elliptical aperture, slightly flattened at the sides, but well-rounded in front and behind. The vertex is near the center, but the apex curves strongly backward, with a minute, smooth, prominent, spiral, incurved nucleus, not distinctly turned to either side. The posterior slope is concave and steep, owing to the incurvature of the apex; the anterior slope is longer and convex, especially toward the summit. The surface is finely and regularly reticulated by radiating and concentric raised lines of nearly equal size, scarcely visible without a lens. The radiating lines may be a little stronger on the sides. Color pale yellowish white.

Length of an ordinary specimen, $2{\cdot}6^{mm}$; breadth, $1{\cdot}8^{mm}$; height, 2^{mm}.

Station 2265, off Chesapeake Bay, in 70 fathoms, several living specimens.

This species resembles in form *Tectura galeola* Jeffreys, but differs in its sculpture.

Turbonilla perlepida Verrill, sp. nov.

Shell long, slender, very glossy, translucent, and snow-white in color. Whorls twelve, moderately convex, with the suture well-impressed, narrow, deep, rather oblique. The upper end of the spire is very slender, regularly coiled, with the apical whorl rather large, prominent, reversed, and strongly incurved. The sculpture consists of about twenty transvere ribs on the lower whorls, which are rounded, not very prominent, and extend across the whorls; on the upper whorls these ribs become less numerous and less distinct, but are more or less evident on all the whorls below the nucleus, which is smooth. The aperture is short and broad-ovate, with the outer lip well-rounded laterally and in front; inner edge somewhat angulated at the base of the columella, which is a little excurved. On the body-whorl the transverse ribs do not extend below the periphery, so that the base is smooth. Umbilicus absent or represented by a minute depression.

Length, 7^{mm}; diameter, $1{\cdot}5^{mm}$; length of aperture, $1{\cdot}1^{mm}$.

Station 2265, off Chesapeake Bay, in 70 fathoms, one living specimen (No. 44,790).

This elegant species is more slender and delicate, and also more lustrous, than any of the allied forms.

Turbonilla grandis Verrill, sp. nov.

Shell very large for the genus, with a long, gradually tapering spire composed of many whorls. Suture a little impressed, shallow, narrow, not very oblique. The whorls are comparatively short, rather flattened, and crossed by slightly raised, rather indefinite, and somewhat irregular ribs, which generally extend entirely across the upper whorls, but fade out above the middle of the body-whorl. The ribs are more regular and more elevated on the upper half of the spire than on the lower half. The surface between the ribs is destitute of spiral sculpture, but is marked by fine and nearly regular lines of growth. The base is smooth and there is no umbilicus. The aperture is short and broad, with an acute angle posteriorly and a decided angle at the base of the columella, which is nearly straight

and has a large, obtuse, rounded spiral fold above the middle. There is also a slight, rounded angle, formed by the junction of the columella with the lip in front.

Length of the seven lower whorls, 18^{mm}; greatest breadth, 6^{mm}; length of body-whorl in front, 7·5^{mm}; length of aperture, 4·5^{mm}; its breadth, 2·5^{mm}. All the upper whorls are broken off.

Station 2228, in 1582 fathoms, one dead specimen (No. 44,791).

This species most resembles *T. Rathbuni*, but it is larger, with more flattened whorls, and has a distinct fold on the columella.

Actæon hebes Verrill, sp. nov.

PLATE XLIV, FIGURE 15.

Shell not very small, short, stout and swollen, broad-ovate in form, with a short spire, (the apex is eroded in both our specimens). The body-whorl is large, swollen, and constitutes the greater part of the shell. The suture is deeply impressed or slightly channeled, the whorl just below it rising abruptly with a convex outline. The penultimate whorl is short, convex, and is surrounded by about three or four punctate grooves. The body-whorl is strongly convex, but very slightly flattened in the middle, its upper portion decidedly swollen; it is covered by about twenty well-marked, revolving grooves, which are closely and very distinctly punctate, the punctations arranged very close together or in contact, and nearly uniform in size; the intervals between the grooves are rather broad and even, with a somewhat lustrous, nearly smooth surface, crossed by slightly sinuous lines of growth. The aperture is ear-shaped, rather broad, narrowed and rounded at the posterior angles, broadly rounded in front, with the inner margin sinuous and strongly excavated at the base of the columella, on which there is an oblique, slightly elevated, obtuse fold. Our specimens, both of which are dead, are white.

Length of the largest specimen, consisting only of the last two whorls, 8^{mm}; breadth, 6·5^{mm}; length of the last whorl, 7·5^{mm}; length of aperture, 6·2^{mm}; its breadth, 3^{mm}.

Station 2224, in 2,574 fathoms. (No. 44,656.)

Cylichna eburnea Verrill, sp. nov.

PLATE XLIV, FIGURE 14.

Shell moderately large for the genus, firm, solid and thick for a shell of this group. The shell is somewhat elongated, broadest in

the middle, tapering toward the posterior end and broadly rounded in front, so that the outline is somewhat conical, but truncated posteriorly. At the tip there is a small, but rather deep pit. The outer lip is thickened, somewhat constricted below the middle and then slightly expanded and broadly rounded anteriorly; posteriorly it bends inward and projects slightly beyond the tip of the shell, and forms a distinct, rounded, posterior sinus. The columella-margin is thickened, without a fold, and moderately excurved. The umbilicus is narrow but deep. The aperture, in front of the middle, is moderately broad and ovate, but farther back it is much narrowed and encroached upon by the body-whorl. The surface is smooth and polished, without any sculpture except a few faint spiral lines close to the posterior end and others which are wavy and even less distinct at the anterior end. Color of the type-specimen, pure white, with a very thin yellowish white epidermis on some parts.

Length, 6^{mm}; greatest breadth, 4^{mm}; length of aperture equal to that of the shell; its greatest breadth, $1{\cdot}8^{mm}$.

Station 2265, off Cape Hatteras, in 70 fathoms. (No. 44,657.)

This species is readily distinguished from all others of our coast by its thickness and solidity, by its distinct umbilicus, and by the evident pit at the posterior end. In form it somewhat resembles *Diaphana conulus*, but it is less narrowed posteriorly, besides being a much larger and stouter shell.

Pleurobranchus Americanus Verrill, sp. nov.

Plate XLIV, figure 13.

In alcohol the body is oblong, higher than wide, with the mantle extending over the greater part of the shell. The foot is large, thick, with short, rounded, grooved auricles in front, its lateral surfaces, like those of the mantle, covered with small projecting spicules. Head bluntly rounded, with two broad, leaf-like oral tentacles and two smaller and narrower posterior tentacles, which are flattened and folded; on the left side there is a conspicuous dark blue eye behind the base of the dorsal tentacle, but on the right side the eye is concealed or wanting, in our specimen. The gill occupies the groove below the mantle on the right side, and is nearly one-third the length of the shell; just in front of the gill there is a low rounded prominence, with a central orifice. The shell is thin, translucent, pale yellowish white, oblong, with the sides nearly parallel and the anterior end bluntly rounded. The spire is a little prominent, ter-

minal, and strongly curved to the left, with the nucleus smooth, glassy, and incurved, situated at some distance from the margin. The surface of the shell is covered with numerous strong, irregular, concentric undulations, and by much smaller and finer lines of growth, which are crossed by microscopic, interrupted, radiating lines, giving a very finely reticulated appearance.

Length of the shell, 13·5^{mm}; breadth, 8·5^{mm}.

Station 2262, off Martha's Vineyard, N. lat. 39° 54′ 45″; W. long. 69° 29′ 45″, in 250 fathoms, green mud and sand; bottom temperature 42° F. One living specimen. (No. 40,503.)

Glaucus margaritaceus (Bosc).

Glaucus Boscii Lesson, Voyage, la Coquille, Zoologie, vol. ii, p. 288, 1830.

Station 2221, N. lat. 39° 05′ 30″; W. long. 70° 44′ 30″. One immature specimen. Station 2224, N. lat. 35° 16′ 30″, W. long. 68° 21′. One adult and three young.

This species agrees very closely with the description of Bosc, as quoted by Lesson, op. cit., p. 283.

Heteropoda.

Firoloidea Lesueurii (D'Orb.) Eydoux and Souleyet.

Voyage, La Bonite, Zoologie, p. 343, atlas, pl. 16, figs. 5–7.

Station 2038, 25 specimens; 2039, 5 spec., 1883; 2174, 2 spec.; 2194, 12 spec.; 2207, 6 spec.; 2235, 1 spec., 1884. The most northern locality was 2194, N. lat. 39° 43′ 45″; W. long. 70° 07′.

Oxygyrus Keraudrenii (Lesueur).

Edoux and Souleyet, Voyage, la Bonite, Zoologie, p. 364, atlas, pl. 18, figs, 1–17.

Oxygyrus Keraudrenii H. and A. Adams, Genera Recent Moll., vol. ii, p. 92; vol. iii, pl. 69, figs. 6–6*b*.

Station 2195, N. lat. 39° 44′, W. long. 70° 03′, 1884. One living specimen of good size, at the surface.

Pteropoda.

Styliola striata (Rang).

Creseis striata Rang, Ann. des sci. nat., vol. xiii, p. 315, pl. 17, fig. 3.

Cleodora striata Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 55, pl. 6, fig. 3, 1852.

Souleyet, Voyage, la Bonite, Zoologie, vol. ii, p. 191, atlas, pl. 8, figs. 1–4.

Station 2,204, N. lat. 39° 30′ 30″, W. long. 71° 44′ 30″. One living specimen (No. 38,513) was taken at the surface.

This species is not uncommon off the eastern coast of Florida. It has also been recorded from the Mediterranean and Indian Ocean.

Spirialis rostralis Souleyet, 1840.

Rang, Hist. Nat. Moll. Pteropodes, p. 62, pl. 14, figs. 7–12.
Eydoux and Souleyet, Voyage, la Bonite, Zoologie, p. 216, atlas, pl. 13, figs. 1–10.

Of this species, living specimens were taken in the trawl-wings at stations 2,219, 2,229, 2,235, 2,236. The most northern was station 2,229, N. lat. 37° 38′ 40″, W. long. 73° 16′ 30″.

Spirialis reticulata (D'Orb.) Rang.

Atlanta reticulata D'Orb., Voyage, p. 178, pl. 12, figs. 32–35 (teste Souleyet).
Spirialis clathrata? Rang and Souleyet, Hist. Nat. Moll. Pteropodes, p. 64, pl. 14, figs. 24–26.
Eydoux and Souleyet, Voyage, la Bonite, Zoologie, p. 220, atlas, pl. 13, figs. 17–19.

A single living specimen occurred at station 2,227, N. lat. 36° 55′ 23″, W. long. 71° 55′.

Pneumodermon Peronii Lam.

Rang, Hist. Nat. Moll. Pteropodes, p. 75, pl. 9, figs. 1–9; pl. 11, figs. 14–19.
Eydoux and Souleyet, Voyage la Bonite, Zoologie, p. 274, atlas, pl. 14, figs. 7–16.

Station 2,210, N. lat. 39° 37′ 45″, W. long. 71° 18′ 45″. Three specimens.

SCAPHOPODA.

Dentalium laqueatum Verrill, sp. nov.

PLATE XLIV, FIGURE 18.

Shell rather large, thick, and strong, moderately stout, gradually tapered, gently curved, chiefly behind the middle. The sculpture consists of about eleven strong, prominent, broad, obtuse, longitudinal ribs, separated by deep, concave interspaces, which are wider than the ribs in the middle of the shell and of about the same breadth posteriorly; at about the anterior third the ribs decrease in prominence, fading out, or becoming flattened into mere obtuse angles at the anterior end; along the middle of the shell a smaller rib intervenes between part of the larger ones; four of the ribs on the convex side are closer together and narrower than the rest, while those on the

concave side are widest apart. Between the ribs the whole surface is covered with regular, fine and close, microscopic longitudinal lines, which also cover the ribs where they are not worn. Distinct and rather close lines of growth cover the surface and in some places make, with the longitudinal striæ, a fine reticulated structure. Anterior aperture nearly round, but slightly angulated in line with the principal ribs; edges thin, but the shell is thickened and the interior is circular farther back. The posterior end is rather small, with a very small aperture, the shell being thickened, but the tip is so eroded as to render uncertain the existence of a slight notch.

Color dull grayish white.

Length, 45^{mm}; diameter of large end, 6^{mm}; of small end, 3^{mm}.

Station 2,268, off Chesapeake Bay, in 68 fathoms, one living specimen (No. 44,671).

This species is easily distinguished from all others of our coast, by the very large and strong longitudinal ribs, and the fine longitudinal striæ between them.

Dentalium ensiculus Jeffreys.

Dentalium ensiculus Jeffreys, Ann. Mag. Nat. Hist., Feb. 1877, p. 154; Proc. Zool. Soc. London, 1882, p. 660, pl. 49, fig. 4.

Station 2,174, off Chesapeake Bay, N. lat. 38° 15′, W. long. 72° 03′, in 1,594 fathoms, two living specimens (No. 38,635); and station 2,221, N. lat. 39° 05′ 30″, W. long. 70° 14′ 30″, in 1,525 fathoms, two specimens, one living (No. 38,636).

This species is easily recognized by its strongly flattened form, with a sharp edge along the convex side. It is rather strongly curved and has a deep posterior notch on the convex side.

Mr. Jeffreys records it from off the European coast, taken by the Porcupine Expedition in 1869 and '70; by the Valorous Expedition, in 1,450 and 1,785 fathoms; and from the Challenger Expedition, in 470 fathoms, off St. Thomas, W. I.

Cadulus spectabilis Verrill, sp. nov.

PLATE XLIV, FIGURE 19.

Shell very large for the genus, rather strongly curved, especially behind the middle, swollen and somewhat angular and gibbous a short distance back of the aperture. The gibbosity or swelling affects most the dorsal side, but is distinct, also, on the sides and ven-

trally; in advance of this swollen part the shell narrows rapidly to the aperture, the decrease being much the greatest on the dorsal side. The aperture is oblique and elliptical in outline, the dorsal margin being distinctly flattened. From the anterior swelling the shell tapers regularly and gradually backward, with an increasing curvature. The posterior opening is not very large, a little flattened, and its margin, when perfect, has a moderately deep notch on each side and a shallower one both above and below. The shell is translucent, and the surface is everywhere smooth and polished, but shows irregular alternating bands of lighter and darker shade, due to greater or less transparency of the substance, and there are also faint longitudinal whitish lines visible in the substance of the shell, but not affecting the surface.

Length, 22^{mm}; greatest diameter, 4^{mm}; breadth of the oral aperture, 2^{mm}; diameter of posterior aperture, 1^{mm}.

Station 2,043, in 1,467 fathoms, 1883, (No. 38,116); stations 2,174, 2,221, 2,222, 2,228, in 1,525 to 1,594 fathoms, 1884. Taken in the largest numbers at station 2,221, where about twenty-five specimens occurred, part of them living, (No. 40,498).

This species is remarkable for its great size, exceeding even *C. grandis;* for its gibbous swelling close to the anterior end; and for the rapid and strongly marked contraction of the oral aperture. By the last named feature it is readily distinguished from *C. grandis.* (See plate xliv, fig. 17).

LAMELLIBRANCHIATA.

Periploma undulata Verrill, sp. nov.

Shell thin, translucent, rather small, compressed, long-ovate, with the beaks a little prominent, situated somewhat in advance of the middle. The anterior end is broadest, somewhat produced and obtusely rounded, with a slight undulation running from the beak to the anterior ventral margin, which is evenly convex in the middle, but is so drawn in as to form a slight emargination at the commencement of the posterior portion; a rather broad, shallow, but well-defined groove runs from the beak to the basal emargination; back of this the posterior portion is rapidly narrowed to the rather small, subtruncate tip; a slightly elevated and roughened ridge runs from the beak to the lower angle of the posterior end; and several finer, radiating lines cover the posterior surface above it. The anterior dorsal margin is convex, and slopes very gradually; the posterior

dorsal margin is nearly straight and slopes more rapidly than the anterior. The sculpture consists of slightly raised but very evident concentric undulations, which, like their concave intervals, are covered with very fine lines of growth. The radial sculpture consists of the anterior and posterior undulations already referred to, and of the thin, raised, radiating lines on the posterior area, above described. The hinge consists of a small, somewhat spoon-shaped cartilage-plate, free at the end, projecting inward nearly at right angles to the margin, and supporting a small, somewhat triangular cartilage-pit. From the posterior margin of this plate a slightly developed, supporting rib, or buttress runs downward and backward for a short distance. A well-defined, narrow, incised notch extends at right angles from the hinge-margin into the center of the beak, just in front of the cartilage-plate. The hinge-margin itself is very thin. The inner surface of the shell is smooth, but wavy, and the muscular scars are indistinct. The epidermis is very thin, tinged with rusty brown toward the margins, showing lines of growth; it is slightly roughened and wrinkled along the posterior radii. Color, pale grayish white.

Length, 13^{mm}; height, 10^{mm}; thickness, about 5·5^{mm}.

Station 2,234, N. lat. 39° 09′, W. long. 72° 03′ 15″, in 816 fathoms (No. 44,840).

This species bears some resemblance to *P. papyracea*, but it is a narrower and more elongated shell, with the posterior end more produced, and with concentric and radiating undulations not seen in the latter. The cartilage-plate is smaller, and the supporting rib much less developed and more oblique than in *P. papyracea*.

Pecchiolia granulifera Verrill, sp. nov.

Shell small, thin, delicate, somewhat three lobed or triangular-cordate, with the anterior and posterior ends a little produced and obtusely rounded, while the ventral margin is more produced and more broadly rounded; the dorsal margin is gently convex behind the beak, and decidedly concave in front of it. The beak is a little prominent, acute, and turned strongly forward. The umbos are rather prominent, and a rounded, ill-defined ridge runs to the postero-ventral margin. The whole surface is closely covered with very small, rough granules, to which minute grains of sand and foraminifera frequently adhere. On the anterior half there are also thin, feebly marked, raised radiating lines, more or less obscured by the granules; anteriorly these become more distinct. Internally the shell is smooth and pearly, but covered with minute white specks. The hinge-margin

is thin, but bears, just in front of the beak, a large, strong, crescent-shaped tooth, convex within, projecting upward nearly at right angles to the margin, and hollowed out on its upper side, at the lunular depression, so that the entire thickness of the tooth is situated within the outline of the edge; another very much smaller, triangular tooth is situated under and behind the beak, within and below the margin. The exterior ligament is small and thin.

Length, 8^{mm}; height, the same.

Station 2,229, off Chesapeake Bay, in 1,423 fathoms. One dead specimen (No. 44,838.)

Tapes, sp.

At station 2,206, in 1,043 fathoms, a single, somewhat eroded left valve of a *Tapes* was dredged, which agrees very closely in size, form and general appearance with *T. virgineus* of Europe. It is, perhaps, a little more oblong, or less convex ventrally, and the concentric ridges are finer, closer, and less raised, or more like lines of growth. The hinge-margin is thicker and stronger. The pallial sinus is smaller, narrower and more pointed.

Length, 38^{mm}; breadth, 22^{mm} (No. 40,108.)

Choristodon (?) cancellatus Verrill, sp. nov.

Shell rather small, swollen, triangular-ovate, with the umbos prominent and swollen, and the beaks large, subspiral, and turned forward, so that in a front view the shell has a strongly cordate form. The anterior end is short and broadly rounded; the posterior end is longer and narrower, somewhat tapered, obtusely rounded at the end. The posterior dorsal margin slopes rapidly, and is subparallel with the ventral margin. There is a small, depressed, distinct, but not much differentiated lunular area in front of the beaks. The sculpture consists of numerous narrow, nearly equal, sharply cut, radiating grooves, separated by wider raised ridges, which are decussated by thin, sharp, raised, concentric lines; these two sets of lines, in crossing each other, produce a rather fine cancellated structure over the entire surface. The hinge consists of two strong central teeth just below the beak, separated by a triangular pit, and supported on a rather broad plate, extending inward from within the thickened margin; the posterior of the two teeth is largest and thickest, and may have been slightly bilobed when perfect. A thin, incised ligamental groove runs from under the beak backward in a curved line between the thickened inner and outer shell-margins. Muscular and pallial scars are not visible, owing to erosion.

Length, 8^{mm}; height, 7^{mm}; thickness, 6^{mm}; beak to posterior end, 7^{mm}; to anterior end, 2^{mm}.

Station 2,265, off Chesapeake Bay, in 70 fathoms. One dead and somewhat eroded left valve (No. 44,839).

The precise generic position of this shell is doubtful, owing to the imperfect preservation of the specimen, which does not show the muscular and pallial scars.

Cryptodon grandis Verrill and Smith, sp. nov.

PLATE XLIV, FIGURE 22.

Shell rather large, thick, angular, remarkably high, owing to the great prominence of the ventral margin and the elevation of the beaks, and with the surface strongly undulated by median and posterior folds. The beaks are high, acute and strongly incurved and turned forward. The lunule is large, cordate, sunken, and defined by a prominent ridge. The posterior dorsal margin has a long, narrow, fusiform ligamental area, bordered by a prominent, rounded ridge. Another larger and more prominent ridge extends from the beaks to the angle, leaving a sunken concave area behind it, and terminating in a prominence or lobe at the margin. Another broad and distinctly elevated, rounded ridge runs from the beak to the ventral margin, which projects downward in a prominent, rounded angle; this median ridge is divided into two parts by a slight furrow just behind the middle. Anteriorly there is a ridge, not very well marked, running from the beaks outside the lunular area and terminating in a rounded projection of the anterior margin. Thus the margin has an anterior and two posterior prominences, besides the great median lobe, while the anterior margin, in the lunular region, is strongly concave and the posterior dorsal margin is convex. The surface is dull grayish white, and closely covered with prominent and often sharply raised lines of growth, which are irregular and wavy or fibrous in appearance. The hinge-margin is thin, with a narrow, elongated ligamental groove, which is strengthened by a narrow buttress within; there are rudiments of teeth.

Length of the largest specimen, 21^{mm}; height, from beak to ventral margin, 24^{mm}; breadth 15^{mm}.

A large living specimen was taken at station 2,231, in 965 fathoms, N. lat. 38° 29′, W. long. 73° 00′. Five valves, some of them nearly as large, were taken at station 2,228, in 1,582 fathoms. A small dead specimen (No. 35,757) was taken in 1883, at station 2,111, off Cape Hatteras, in 938 fathoms.

Cryptodon plicatus Verrill, sp. nov.

Shell not very small, somewhat swollen, and rather thick for the genus; triangular-cordate in form, with very high and acute beaks, which curve forward but little. The anterior dorsal margin is nearly straight, but a little concave opposite the rather large, depressed lunular area; the posterior dorsal margin is broadly convex and rendered irregular by the strong plications of the margin; the ventral margin is well-rounded, strongly angulated or lobed by the plications, and a little produced in the middle, in a line with the median ridge. The shell is remarkable for the unusual number of plications and undulations of its surface. Posteriorly there are two very large, much raised, sharply angulated plications, with a very deep concave depression between them, and a deep furrow between the hindermost and the edge of the shell; the second and larger fold is separated from a rounded or obtusely angulated median ridge by a broader concave depression. This median ridge is large and very distinct, and somewhat angular ventrally; farther forward there is a similar, but less marked, ridge, extending to the anterior part of the ventral margin. Anteriorly there is a very large, long-cordate, nearly smooth, concave lunule, which is bounded by two small, distinct posterior ridges, which are near together and run to the antero-ventral angle. The surface is covered by irregular and rather strong lines of growth, which become somewhat lamellose in crossing the strong plications. The hinge-margin is considerably thickened behind the beak, with a deep and conspicuous, curved ligamental groove, back of which the edge becomes thin and flaring. The interior is angulated, corresponding to the exterior plications, and is marked by irregular radial striæ near the ventral margin.

Length of the largest specimen, 11^{mm}; height, 13^{mm}; thickness, 8^{mm}.

The largest and most typical example is a valve from station 2,193, N. lat. 39° 44′ 30″, W. long. 70° 10′ 30″, in 1,122 fathoms (No. 44,825). A young living specimen, apparent identical, was taken at station 2,205, in 1,073 fathoms (No. 44,826).

This species is closely related to *C. grandis* V., but it has more numerous and more strongly developed plications; its beaks are more elevated and less curved forward, so that the form is more triangular; the ventral margin is less produced in the line of the median ridge; the shell also appears to be thicker and more swollen.

Kelliella nitida Verrill, sp. nov.

Shell thin, delicate, translucent white, swollen, subcordate in a side view; in a front view regularly broad-cordate. Umbos swollen; beaks strongly curved forward; lunular area broad-cordate, running up between the beaks and bounded by a definitely impressed line. The posterior dorsal outline is sloping and slightly convex, forming a slight angle where it joins the broadly rounded ventral margin; in the middle of the ventral margin there is a slightly marked, broadly rounded angle, from which a faint but perceptible ridge runs up to the umbos. The surface is everywhere covered with fine, close, very regular raised lines, and usually has an iridescent luster. The hinge in the right valve consists of a long, thin, flexuous lamina, separated by a groove from the margin, rising into two somewhat thickened and more elevated lobes opposite the beaks, and with a small, thin, partially detached, tooth-like process farther forward. The two anterior lobes, viewed in some directions, appear like two small, thin teeth, separated by a notch, and projecting somewhat downward. In the left valve the lamina is more complicated, just behind the beak it splits into two portions, leaving a groove between; the anterior portion forms a long, flexuous lobe opposite the beak, the anterior end expanding slightly and rising above the margin like a small curved tooth; farther forward and separated by a notch, it forms another similar tooth-like lobe. The ligament is light yellow and occupies a short, well-marked groove, behind and under the beak.

Length of the largest specimens, 5·5^{mm}; height, 5^{mm}; thickness, 4·5^{mm}.

Station 2221, in 1,525 fathoms, about a dozen specimens, alive and dead (No. 40,498). Station 2038, in 2,033 fathoms, one dead specimen (No. 35,217.)

This species is closely related to *K. miliaris* of Europe, but is larger, more angular, and more distinctly and regularly sculptured. The European species has been regarded by Jeffreys as the young of *Isocardia cor*, but G. O. Sars and others consider it a distinct form. On the American side no species of *Isocardia* is known, which renders it probable that the present shell is an adult form.

Nucula trigona Verrill, sp. nov.

Shell of moderate size, rather thick and solid, conspicuously triangular, with the beaks high, forming an acute angle. The surface is smooth and lustrous, marked only with very faint lines of growth.

The anterior margin is nearly straight, the posterior dorsal margin is slightly convex; the two form an acute angle, while the ventral margin is broadly rounded, or sometimes subtruncate in the middle, so that the anterior and posterior angles are obtusely rounded, the posterior end being a little more prominent. The shell is somewhat swollen in the larger specimen. The beaks are small and curve directly inward. The hinge-margin is stout, with a rather large cartilage-pit. The anterior row includes about eight elevated, acute teeth, nearly in a straight row; the posterior row is a little curved, and includes about ten similar teeth. The interior is pearly, with strongly marked muscular scars. The margin is plain. The epidermis is firm, smooth, closely adherent, and light greenish yellow in color.

Length of the largest specimens, $1{\cdot}5^{mm}$; height, 5^{mm}; breadth, 3^{mm}. Younger specimens are not quite so high in proportion to their length.

Station 2,194, in 1,140 fathoms, one valve; station 2,228, in 1,582 fathoms, one live specimen; and station 2,229, in 1,423 fathoms, N. lat. 37° 38′ 40″, W. long. 73° 16′ 30″, six live specimens.

This species is remarkable for its triangular form and the acute angle formed by its dorsal margins, as well as for its smooth and lustrous exterior. In all these characters it differs widely from all our other species.

Arca profundicola Verrill and Smith, sp. nov.

PLATE XLIV, FIGURES 23, 23*a*.

Shell rather small, elongated, angular and oblique, very inequilateral, with the posterior end elongated and expanded; the anterior end short and oblique, angulated above; the ventral margin oblique and incurved in front of the middle.

The shell is covered with a rather coarse, dark brown epidermis, rising into elongated and conspicuous scales and lamellæ, which become longer and more conspicuous posteriorly, where they form a fringe beyond the margin. Beneath the epidermis the sculpture consists of small, wavy, concentric ridges, parallel with the lines of growth, and of rather fine, regular, radiating grooves, separated by rather wider, rounded interspaces, which are often a little nodulous in crossing the concentric ridges. The beaks are prominent, angular, curved inward and a little forward, and somewhat flattened in the middle. A flattened or somewhat indented area extends from the beaks to the margin. The dorsal margin is straight and is about

two-thirds the length of the shell; the ligamental area is narrow-lanceolate, becoming long and narrow posteriorly; its surface has only faint lines of growth, but its margins are clearly defined. The posterior margin descends obliquely, or with a slight incurvature, and then expands in a rounded curve. The ventral margin is gently convex, except where slightly indented by the byssal sinus. The anterior end is very short and narrow, ending superiorly in a small, obtuse angle. The inner margin is simple and plain, without any crenulations. The hinge-margin is thin and the teeth are small and rather inconspicuous; the posterior ones are eight or nine in number, in the form of very oblique, slightly raised ridges or folds, the two or three most posterior becoming less oblique and more conspicuous; the short anterior portion bears about six small but prominent teeth, which stand nearly transverse to the margin.

Length, 12^{mm}; height, 7^{mm}; thickness, 5^{mm}.

Station 2,226, in 2,021 fathoms, N. lat. 37°, W. long. 71° 54′; seven living specimens (No. 44,501).

This species is much more elongated and more expanded posteriorly than any form of *A. pectunculoides*, and the beaks are more prominent and nearer the anterior end. It is a much larger species.

Limopsis aurita? Jeffreys.

? Arca aurita Brocchi, Conch. foss. Subap., ii, p. 485, pl. 11, fig. 9, (t. Jeffreys.)
Limopsis aurita Jeffreys, British Conch., ii, p. 161, pl. 4, fig. 3; vol. v, pl. 30, fig. 1.

Shell large for the genus, compressed, very oblique, somewhat rhomboidal, with rounded corners, and the posterior ventral margin much produced and broadly rounded. The umbos are not prominent; the beaks are small, acute and curve directly inward. The dorsal margin is nearly straight, with rounded ends, and is much shorter than either of the other sides, its length being less than one-fourth the circumference of the shell. The ligament-area is very narrow and long, extending nearly the whole length of the dorsal margin. The cartilage is rather small and triangular. The hinge-plate is not very broad, considerably curved within, very narrow, and destitute of teeth at the center, opposite the cartilage-pit. It expands regularly and about equally on each side, and bears about six moderately stout, somewhat oblique, rounded teeth on the posterior side, and six or seven thinner, closer, and more transverse teeth on the anterior side, the two outer ones becoming more distant and much more oblique than the rest. The posterior margin is nearly straight for the greater part of its length, and the anterior margin is

nearly parallel with it, though longer and more broadly rounded, passing insensibly into the curvature of the ventral margin; the entire margin is flat, beveled, and perfectly plain, with a simple but distinctly angulated inner rim. Externally the shell, when fresh, is covered with a thick, lamellose, and fringed, light yellowish brown epidermis; over the central portion the epidermal processes are long, thin, and hair-like, and arranged in radiating lines; toward the margin, especially ventrally and posteriorly, they become long, flat, thin and deeply lacerate or fringed at the end; on the umbos the processes become small and ciliated with a distinct radial arrangement.

Beneath the epidermis the shell is everywhere covered with pretty regular concentric undulations, formed by thin, rather sharp, raised lines, separated by regular concave intervals; anteriorly the ridges become less evident and very close; small, but distinct, radiating striæ cross the ridges over the central parts of the shell and are deeper or incised in crossing the summits of the ridges; anteriorly the radiating striæ entirely disappear; toward the posterior end they become stronger and on the posterior area they are gradually replaced by elevated radii which in crossing the concentric lines produce a distinctly granulated appearance.

The inner surface is nearly smooth and somewhat lustrous, but sometimes minutely radially striated. The muscular scars are small, but distinct.

Length of the largest specimens, including epidermis, 22^{mm}; without the epidermis, 19^{mm}; height from beak to ventral margin, 17^{mm}; length of dorsal margin, 9^{mm}; transverse breadth, 10^{mm}.

Station 2228, in 1,582 fathoms, two living specimens (No. 44,822); and station 2221, in 1,525 fathoms. One dead specimen (No. 40,498.)

This shell is larger, more oblique, and has a thinner hinge-plate than the form described and figured by Jeffreys. Whether it be identical with the original fossil shell, described by Brocchi, may be questionable.

Limopsis plana Verrill, sp. nov.

Shell rather large for the genus, broad, moderately compressed, decidedly oblique, with a thin, straight hinge-margin and a wide, elongated fusiform ligamental area, interrupted in the middle by a large, triangular cartilage-pit. The straight dorsal margin is less than one-fifth the circumference of the shell, and does not extend so far forward as the convexly rounded anterior margin; the ventral margin is regularly rounded and considerably produced backward;

the posterior margin is decidedly oblique and nearly straight, forming a distinct angle where it joins the dorsal margin. The umbos are a little prominent; the beaks are directly incurved, small, and situated at about the middle of the dorsal margin. The exterior of the shell is rather smooth beneath the epidermis, but covered with numerous small, somewhat irregular undulations or ridges, and by smaller lines of growth; the radiating lines are very faint or almost entirely obsolete over the greater part of the shell, but in fresh specimens are indicated by the rows of slender epidermal hairs. The epidermis is light brown, thin, easily removed, and bears numerous radiating rows of fine slender hairs, which become longer and more crowded near the margin. The thin hinge-plate is nearly straight on the inside, and bears about three or four teeth on each side of the ligament-pit; three of those on the posterior side being larger and more distinct than the rest, while on the anterior side the three larger ones are but little prominent and decidedly oblique. The inner surface is smooth, and the margin is thin and plain, slightly beveled close to the edge.

Length, 14^{mm}; height, 14^{mm}; thickness, 8^{mm}; length of hinge-margin, 8·5^{mm}; breadth of ligament area, on one valve, 2^{mm}.

Station 2098, in 2,221 fathoms, two living specimens. (No. 35,-238.)

This species resembles, in size and form, the shell which we here refer to *L. aurita*, with which it also agrees in having a plain margin, but it differs decidedly in having a much broader ligament area, and a much larger cartilage-pit. Its hinge-margin is very much thinner, and the teeth fewer, less prominent, and more oblique. Externally the surface is much smoother, the concentric lines smaller, and less elevated, while the radial lines are much less distinct. The epidermis is thinner and less densely covered with hairs and scale-like processes.

Limopsis affinis Verrill, sp. nov.

Shell of moderate size, rather swollen, very oblique, with a broad and rather short ligamental area, and a short, curved hinge-margin, with few teeth.

The shell is subovate and very oblique; the dorsal margin is rather short and nearly straight, joining the anterior and posterior margins with obtusely rounded angles; the anterior margin is rounded and projects beyond the anterior angle, and then strongly recedes in a broad regular curve, the posterior ventral margin is obtusely rounded

and strongly produced backward; the posterior margin is very broadly rounded, its direction nearly parallel to the opposite part of the anterior margin. The edge of the shell is crenulated with a row of small rounded tubercles situated just within the margin, the largest along the ventral edge, disappearing toward the anterior end. Small radial grooves run inward from between these tubercles for a short distance. The ligament-area is unusually wide, somewhat concave, with a large cartilage-pit in the middle, which is elongated in a direction transverse to the ligament, with the sides parallel and the apex triangular. The hinge-plate is thin in the middle, becoming rather broad at each end, so that the inner margin is curved or angulated in the middle. The anterior end bears about four prominent rounded teeth, the outermost the largest. The posterior end has four or five prominent teeth, increasing in size outwardly; the last two are decidedly larger than the rest and somewhat oblique. The umbos are rather prominent and the beak curves directly inward towards the cartilage-pit, and is situated some distance from the margin, owing to the breadth of the ligamental area. The surface is covered with small, rather regular concentric undulations or ridges, which are crossed by radiating lines that are not very distinct over the greater part of the shell, and become nearly or quite obsolete on the umbos. The epidermis is light yellowish brown, and rises into series of slender hair-like processes along the radiating lines; these epidermal hairs become longer and crowded toward the margin, where they are more or less united and form a marginal fringe.

Length, $10{\cdot}5^{mm}$; height, 11^{mm}; thickness, 8^{mm}; length of dorsal margin, 5^{mm}; breadth of ligament-area, 2^{mm}.

Station 2092, in 197 fathoms; two living specimens (No. 44,829.)

This species resembles *L. minuta* in size and general appearance, but it is more oblique and more produced ventrally, and is widely different from that and all our other species, except *L. plana*, in having a broad ligamental area and large cartilage-pit. It is also peculiar in the character of its hinge-margin, and in its teeth, which are few in number, prominent, rounded, and scarcely oblique, except the outer ones on the posterior side. Externally the surface is smoother than in most species, the radial lines being but little evident when the epidermis is off. Although resembling *L. plana* in its broad ligament-area, it differs in having the ventral margin strongly crenulated, instead of plain, and in form it is a narrower, more oblique, and more swollen shell.

Crenella fragilis Verrill, sp. nov.

Shell large for the genus, very thin and fragile, translucent, iridescent within, in form oblong-ovate, very oblique, the anterior end short, a little expanded and broadly rounded, while the shell is very much swollen and prolonged ventrally. The posterior side falls off rapidly from the beak and is only a little convex, so that the margin of the valve has a nearly elliptical outline, with the longer axis extending from the beak to the ventral margin. The umbos are prominent and the beaks are strongly incurved and turned forward, and separated from the margin of the shell by a deep, narrow ligamental groove. The hinge-margin is thin and nearly plain, without any denticles. The ligament is long and extends from the front of the beak back more than a third of the length of the posterior margin. The sculpture consists of very regular, fine, radiating, raised lines, scarcely visible without a lens, separated by furrows a little wider; these are more or less interrupted by numerous fine but irregular raised lines of growth. The epidermis is very thin, smooth, pale olive.

Height of the smaller example, from beak to ventral margin, 14^{mm}; length from anterior to posterior margins, 9^{mm}; thickness, 12^{mm}. A broken specimen from the same locality is more than twice as large as the one measured.

Station 2,265, off Chesapeake Bay, N. lat. 37° 07′ 40″, W. long. 74° 35′ 40″, in 70 fathoms, green mud, gravel, and broken shells; bottom temperature 63° F. Two dead but fresh specimens (Nos. 40,676 and 41,543).

This species is remarkable for its large size, compared with other species; the extreme thinness and translucency of the shell; and for the fine and regular radiating lines that cover the entire surface.

Pecten undatus Verrill and Smith, sp. nov.

PLATE XLIV, FIGURE 21.

Shell small, oblique, very thin, fragile and translucent. The valves are similar in form and sculpture, but the left is a little more convex. Both are regularly undulated and everywhere covered by numerous, rather fine and regular raised radiating lines. In the right valve the anterior ear is considerably prolonged; with a deep acute notch below it; in the other valve the ear is less elongated and the notch is shallow and broadly concave; the posterior ear in both valves is

short-triangular, subacute, with a shallow concave notch. The ligament-pit is small and triangular. The hinge-margin is thin and simple. Beaks small, rising slightly above the margin in the left valve, and not quite reaching the margin in the right valve. The anterior margin of the shell projects considerably forward in a broad curve; the ventral margin is broadly and regularly arched, but projects downward a little more strongly behind the middle; the posterior margin is much less convex than the anterior, and in its upper part somewhat straightened. The concentric undulations of the surface are broad and regular, the depressions about equal to the undulations; they become much broader in proportion as they recede from the umbos, the last four occupying about one-half the breadth of the shell. The radiating lines are very thin, but distinctly elevated and roughened, or rendered slightly irregular by the very fine microscopic lines of growth, which everywhere cover the shell. The radiating lines are readily visible without a lens. Color translucent bluish white.

Length, 19^{mm}; height, 20^{mm}; breadth, 5^{mm}.

The single living specimen was taken at station 2229, in 1,423 fathoms, N. lat. 37° 38′ 40″, W. long. 73° 16′ 30″, (No. 44,827); a fragment occurred at station 2221, in 1,525 fathoms (No. 44,828.)

BRACHIOPODA.

Atretia gnomon Jeffreys.

Ann. Mag. Nat. Hist., Sept., 1876, p. 251; Proc. Zool. Soc. London, for 1878, p. 412, pl. 23, fig. 4.

Verrill, Trans., Conn. Acad., vol. vi, p. 234, 1884.

This species was included in my preceding catalogue as one of those which had been taken off the coast of Labrador (Valorous Exp.), but not from off the coast of the United States. In 1884, however, it was taken in large numbers at station 2221, N. lat. 39° 05′ 30″, W. long. 70° 44′ 30″, in 1,525 fathoms (two hundred and twenty-five specimens, mostly living.) A few specimens also occurred at the adjacent station, 2222, in 1,537 fathoms; and a single living specimen was taken at station 2174, N. lat. 38° 15′, W. long. 72° 03′, in 1,594 fathoms.

These specimens agree perfectly with north European specimens sent by Dr. Friele.

Discina Atlantica King.

Verrill, Trans. Conn. Acad., vol. vi, p. 233, 1884.

PLATE XLIV, FIGURE 24.

Living specimens of this species were taken in considerable numbers at station 2226, in 2,021 fathoms; and 2229, in 1,423 fathoms. A few living specimens also occurred at station 2208, in 1,178 fathoms; and 2228, in 1,582 fathoms.

In most cases it was found adhering to hard concretions of clay, consolidated by oxide of iron, etc.

List of deep water species added to the fauna during the summer of 1884.

The following list is supplementary to the list of 1883 (see p. 264) and is written in the same form. An asterisk (*) indicates living specimen; a dagger (†) dead specimens.

CEPHALOPODA.

Ancistrocheirus megaptera V. sp. nov. vi, 399, pl. 42, f. 1, 1*a*.
Bathymetrical range, 707 fathoms.

Teleoteuthis (*Onychia*) *agilis* V. sp. nov. vi, 400, pl. 42, f. 2, 2*a*.
Surface.

Benthoteuthis megalops V. gen. and sp. nov. vi, 402, pl. 44, f. 1.
B. range, 600 to 1073 f.

Cirrhoteuthis plena V. sp. nov. vi, 404, pl. 42, f. 3.
B. range, 1073 f.

Cirrhoteuthis megaptera V. sp. nov. vi, 405, pl. 43, f. 1, 2.
B. range, 1054 to 2574 f.

Opisthoteuthis Agassizii V. vi, 408.
B. range, 1230 f. Cb.

GASTROPODA.

TOXOGLOSSA.

Pleurotomella Jeffreysii V. sp. nov. vi, 411, pl. 44, f. 3.
B. range, 1168 f.†; 1525 to 1537 f.*

Pleurotomella tincta V. sp. nov. vi, 412, pl. 44, f. 4.
B. range, 2512 f.*; 2574 f.†

Pleurotomella Frielei V. sp. nov. vi, 413, pl. 44, f. 5.
B. range, 1168 f.†; 1178 f.*

Pleurotomella vitrea V. sp. nov. vi, 414, pl. 44, f. 6.
B. range, 428 f.
Pleurotomella Lottæ V. sp. nov. vi, 415, pl. 44, f. 7.
B. range, 1525 f.
Gymnobela brevis V. sp. nov. vi, 417, pl. 44, f. 8.
B. range, 1290 to 1608 f.* ; 1423 f.†
Bela Blakei V. sp. nov. vi, 417.
B. range, 2021 f.
Bela tenuicostata G. O. Sars. vi, 419.
B. range, 843 to 1290 f.
Admete nodosa V. and S. sp. nov. vi, 419, pl. 44, f. 9.
B. range, 816 f.* ; 924 f.†

RACHIGLOSSA.

Marginella Smithii V.=*M. Virginiana* V., *non* Con. vi, 420, 452.
B. range, 15 to 70 f.† ; 16 f.* S.
Trophon abyssorum V. sp. nov. vi, 176, 421.
B. range, 843 to 1731 f.* ; 1467 to 1555 f.†
Trophon abyssorum, var. *limicola* V. nov. vi, 421.
B. range, 1178 to 1423 f.† ; 1290 to 2033 f.*
Jumala brychia V. and S. sp. nov. vi, 422, pl. 44, f. 10, 10*a*.
B. range, 2574 f.
Omalaxis nobilis V. sp. nov. vi, 423, pl. 44, f. 12.
B. range, 70 f.

RHIPHIDOGLOSSA.

Delphinula nitida V. and S. sp. nov. vi, 424, pl. 44, f. 11.
B. range, 1423 f.†
Margarita, sp. nov. vi, 425.
B. range, 70 f.†
Lepeta cæca (Müll) Gray.
B. range, 250 f. N., Arc., Eu.
Puncturella abyssicola V. sp. nov. vi, 425.
B. range, 1537 f.†
Cocculina recticulata V. sp. nov. vi, 426.
B. range, 70 f.

GYMNOGLOSSA.

Turbonilla perlepida V. sp. nov. vi, 427.
B. range, 70 f.
Turbonilla grandis V. sp. nov. vi, 427.
B. range, 1582 f.†

TECTIBRANCHIATA.

Actæon hebes V. sp. nov. vi, 428, pl. 44, f. 15.
B. range, 2574 f.†
Cylichna eburnea V. sp. nov. vi, 428, pl. 44, f. 14.
B. range, 70 f.†
Pleurobranchus Americanus V. sp. nov. vi, 429, pl. 44, f. 13.
B. range, 250 f.

NUDIBRANCHIATA.

Glaucus margaritaceus (Bosc.) vi, 430.
Surface.

HETEROPODA.

Firoloidea Lesueurii (D'Orb.) Eyd. and Soul. vi, 430.
Surface.
Oxygyrus Keraudrenii (Les.) vi, 430.
Surface.

PTEROPODA.

Styliola striata (Rang.) vi, 430.
Surface.
Spirialis rostralis Soul. vi, 431.
Surface.
Spirialis reticulata (D'Orb.) Rang. vi, 431.
Surface ; 2109 f.†
Pneumodermon Peronii Lam. vi, 431.
Surface.

SOLENOCONCHA.

Dentalium laqueatum V. sp. nov. vi, 431, pl. 44, f. 18.
B. range, 68 f.†
Dentalium ensiculus Jeff. vi, 432.
B. range, 1525 to 1594 f. Eu.
Cadulus spectabilis V. sp. nov. vi, 432, pl. 44, f. 19.
B. range, 1467 to 1582 f.†; 1525 to 1594 f.*

LAMELLIBRANCHIATA.

Periploma undulata V. sp. nov. vi, 433.
B. range, 816 f.†
Pecchiolia granulifera V. sp. nov. vi, 434.
B. range, 1423 f.†
Tapes sp. vi, 435.
B. ranges, 1043 f.†
Choristodon ? cancellatus V. sp. nov. vi, 435.
B. range, 70 f.†
Cryptodon grandis V. and S. sp. nov. vi, 436, pl. 44, f. 22.
B. range, 938 to 1582 f.† ; 965 f.*
Cryptodon plicatus V. sp. nov. vi, 437.
B. range, 1073 to 1122 f.†
Kelliella nitida V. sp. nov. vi, 438.
B. range, 1525 to 2033 f.
Nucula trigona V. sp. nov. vi, 438.
B. range, 1140 f.† ; 1423 to 1582 f.*

Limopsis plana V. sp. nov. vi, 441.
B. range, 2221 f.
Limopsis aurita? (Brocchi.) Jeff. vi, 440.
B. range, 1525 to 1582 f. Eu.
Limopsis affinis V. sp. nov. vi, 442.
B. range, 142 f.
Arca profundicola V. and S. sp. nov. vi, 439, pl. 44, f. 17, 18.
B. range, 2021 f.
Crenella fragilis V. sp. nov. vi, 444.
B. range, 70 f.
Pecten undatus V. and S. sp. nov. vi, 444, pl. 44, f. 21.
B. range, 1423 to 1525 f.

BRACHIOPODA.

Atretia gnomon Jeff. vi, 445.
B. Range, 1525 to 1594 f. N., Eu.

List of species found between 1000 *and* 2000 *fathoms, additional to those recorded in the list of* 1883. (See p. 282.)

Those species printed in italics have not been taken by us in less than 1000 fathoms.

CEPHALOPODA.

	Fathoms.		Fathoms.
Benthoteuthis megalops V.	600–1073	*Cirrhoteuthis megaptera* V.	1054–2574
Cirrhoteuthis plena V.	1073	*Opisthoteuthis Agassizii* V.	1230

GASTROPODA.

Toxoglossa.	Fathoms.		Fathoms.
		T. abyssorum, var. *limicola* V.	1178–2033
Pleurotomella Jeffreysii V.	1168–1537	Anachis Haliæeti (Jeff.) V.	48–1537
Pleurotomella Frielei V.	1168–1178	Tænioglossa.	
Pleurotomella Lottæ V.	1525	Lamellaria pellucida V.	43–2574
Gymnobela brevis V.	1290–1608	Cerithiella Whiteavesii V.	238–1594
Bela tenuicostata G. O. Sars.	843–1290	Rhiphidoglossa.	
Rachiglossa.		*Delphinula nitida* V. and S.	1423
Sipho cælatus V.	75–1537	*Puncturella abyssicola* V.	1537
Sipho hispidus V.	1525–2033	Gymnoglossa.	
Trophon abyssorum V.	843–1731	*Turbonilla grandis* V.	1582

SCAPHOPODA.

	Fathoms.		Fathoms.
Dentalium ensiculus Jeff.	1525–1594	Cadulus Watsoni Dall.	70–1537
Cadulus spectabilis V.	1467–1594	Cadulus Jeffreysii? (Monteros.)	115–1122

LAMELLIBRANCHIATA.

	Fathoms.		Fathoms.
Pecchiolia granulifera V.	1423	*Nucula trigona* V.	1140–1582
Tapes, sp. nov.	1043	Limopsis cristata Jeff.	64–1525
Cryptodon grandis V. and S.	938–1582	*Limopsis aurita?* Jeff.	1525–1582
Cryptodon plicatus V.	1073–1122	Pecten fragilis Jeff.	578–1525
Solemya velum*	1–1600	*Pecten undatus* V. and S.	1423–1525
Kelliella nitida V.	1525–2033		

BRACHIOPODA.

	Fathoms.
Atretia gnomon Jeff.	1525–1594

List of species found at depths exceeding 2000 *fathoms, additional to those recorded in the list of* 1883. (See p. 284.)

CEPHALOPODA.

	Fathoms.		Fathoms.
Mastigoteuthis Agassizii V.	640–2516	Cirrhoteuthis megaptera V.	1054–2574

GASTROPODA.

TOXOGLOSSA.

	Fathoms.
Pleurotomella tincta V.	2512–2574
Bela Blakei V.	2021

RACHIGLOSSA.

Nassa nigrolabra V.	155–2574
Trophon abyssorum, var. limicola V.	1178–2033
Jumala brychia V. and S.	2574

TÆNIGLOSSA.

	Fathoms.
Lamellaria pellucida V.	43–2574

TECTIBRANCHIATA.

Actæon hebes V.	2574

LAMELLIBRANCHIATA.

	Fathoms.		Fathoms.
Abra longicallis (Scacchi.)	924–2574	*Arca profundicola* V. and S.	2021
Kelliella nitida V.	1525–2033	*Limopsis plana* V.	2221

BRACHIOPODA.

	Fathoms.
Discina Atlantica King.	1178–2021

* Living specimens have not been taken below 300 fathoms. The specimen from 1600 fathoms is fragmentary and its occurrence is probably accidental. The next deepest locality is 384 fathoms.

EXPLANATION OF PLATES.

PLATE XLII.

Figure 1.—*Ancistocheirus megaptera* (p. 399.) Dorsal view. Natural size. Part of the arms are mutilated.

Figure 1*a*.—The same. Front view of a part of one of the lateral arms; × 4.

Figure 2.—*Teleoteuthis agilis* (p. 400.) Dorsal view of the type specimen; × 2.

Figure 2*a*.—The same. Club of one of the tentacular arms; × 4.

Figure 3.—*Cirrhoteuthis plena* (p. 404.) Ventral view. One-half natural size.

Figure 4.—*Octopus Carolinensis* (p. 235.) Dorsal view of the type specimen. Natural size.

Figure 5.—*Octopus piscatorum* (p. 248.) Male. The hectocotylized arm; × 2. From station 2035.

Figure 3 was drawn by Mr. J. H. Blake; the others by Mr. J. H. Emerton. All the figures are from alcoholic specimens.

PLATE XLIII.

Figure 1.—*Cirrhoteuthis megaptera* (p. 405.) Dorsal view. One-half natural size.

Figure 2.—The same. Ventral view. One-half natural size.

Both figures are copied from sketches made on shipboard by Mr. A. Baldwin from the living specimens, when first taken.

PLATE XLIV.

Figure 1.—*Benthoteuthis megalops* (p. 402.) Dorsal view of one of the type specimens. Natural size.

Figure 2.—*Abralia megalops* (p. 143.) Ventral view of the largest specimen. Natural size. This example has raised verrucæ on the ventral side.

Figure 2*a*.—The same. Right tentacular arm. Front view; × 4.

Figure 3.—*Pleurotomella Jeffreysii* (p. 411.) Male. From station 2222. Front view. Natural size.

Figure 4.—*Pleurotomella tincta* (p. 412.) Station 2225. Front view. Natural size.

Figure 5.—*Pleurotomella Frielei* (p. 413.) Front view of the type specimen. Natural size.

Figure 6.—*Pleurotomella vitrea* (p. 414.) Front view; × 4.

Figure 7.—*Pleurotomella Lottæ* (p. 415.) Front view of the type specimen; × 2.

Figure 8.—*Gymnobela brevis* (p. 417.) Front view of the type specimen; × 4.

Figure 9.—*Admete nodosa* (p. 419.) Front view of the type specimen; × 2.

Figure 10.—*Jumala brychia* (p. 422.) Front view of type specimen. Natural size.

Figure 10*a*.—The same. Operculum; × 2.

Figure 11.—*Delphinula nitida* (p. 424.) Front view of the type specimen; × 4.
Figure 12.—*Omalaxis nobilis* (p. 423.) Front view of the best specimen; × 2.
Figure 13.—*Pleurobranchus Americanus* (p. 429.) Side view of the type-specimen as preserved in alcohol; × 2.
Figure 14.—*Cylichna eburnea* (p. 428.) Front view of the type-specimen; × 3.
Figure 15.—*Actæon hebes* (p. 428.) Front view of the type-specimen; × 2.
Figure 16.—*Dentalium solidum* (p. 215.) Side view of a medium sized specimen to show the outline, most of the longitudinal lines are omitted. Natural size.
Figure 17.—The same. Side view of a young specimen. Natural size.
Figure 18.—*Dentalium laqueatum* (p. 431.) Transverse section across the middle to show the size and arrangement of the ribs; × $2\frac{1}{2}$.
Figure 19.—*Cadulus spectabilis* (p. 423.) Side view of one of the type-specimens; × 2
Figure 20.—*Cadulus grandis* (p. 219.) Side view of one of the type-specimens; × 2.
Figure 21.—*Pecten undatus* (p. 444.) Type-specimen. Natural size.
Figure 22.—*Cryptodon grandis* (p. 436.) One of the type-specimens. Natural size.
Figure 23.—*Arca profundicola* (p. 439.) Type-specimen; × 2.
Figure 23*a*.—The same. View of the interior of a valve; × 2.
Figure 24.—*Discina Atlantica* (pp. 233, 446.) View of one of the most perfect examples; × 4.

Figures 1, 2, 2*a* and 24 were drawn by Mr. J. H. Blake; figures 12, 14 and 18 by the author; the rest of the figures by Mr. J. H. Emerton.

Additions and Corrections.

Page 408, line 20, for 1058, read 1230.

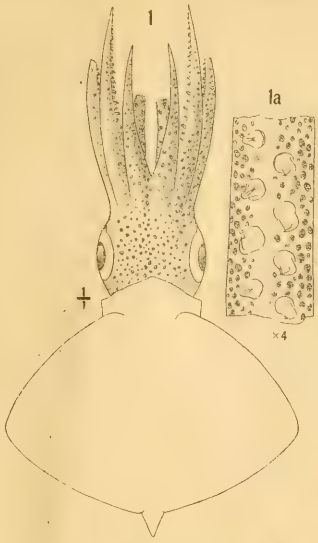
Page 409, line 31, for 1883, read 1884.

Bela Blakei, p. 417, line 4 from bottom. The figure referred to (pl. 44, fig. 8), really represents *Gymnobela brevis* V., same page.

Marginella Smithii V. This name is proposed as a substitute for *M. Virginiana* (p. 420), preoccupied by Conrad for a fossil. It is dedicated to Mr. Sanderson Smith.

Skenea (?) *lirata* V. = *Omalaxis* (?) *lirata* V., vol. v, p. 529. This species is common in 10 to 43 fathoms off Cape Hatteras, but has not been preserved with the animal, so that the genus is still uncertain.

Lepeta cæca (Müll.) Gray. This species was taken alive at station 2262, in 250 fathoms.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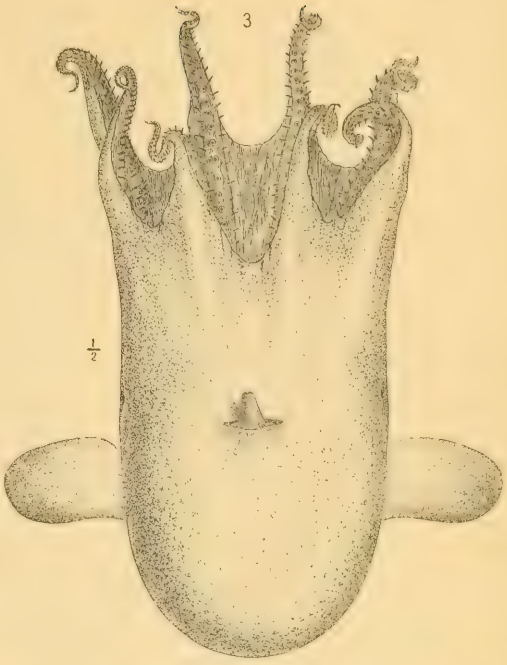
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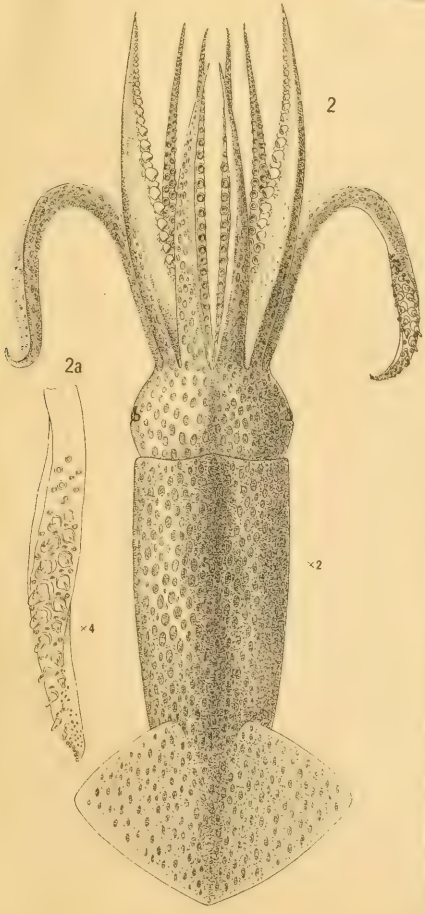
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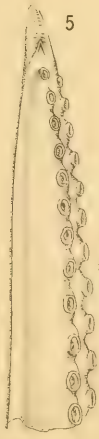
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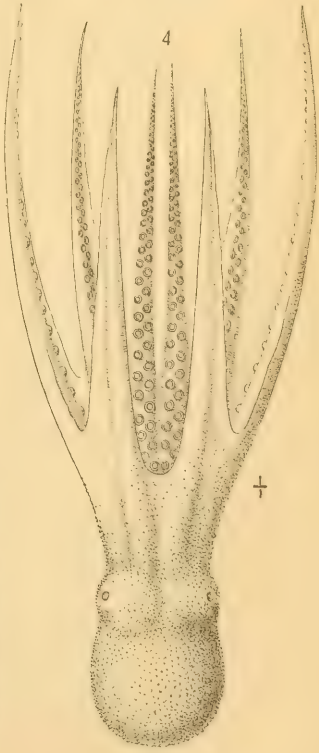
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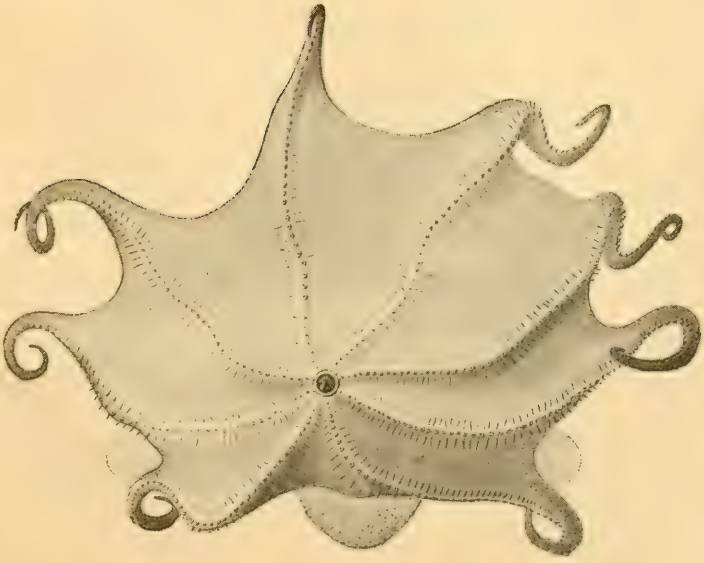

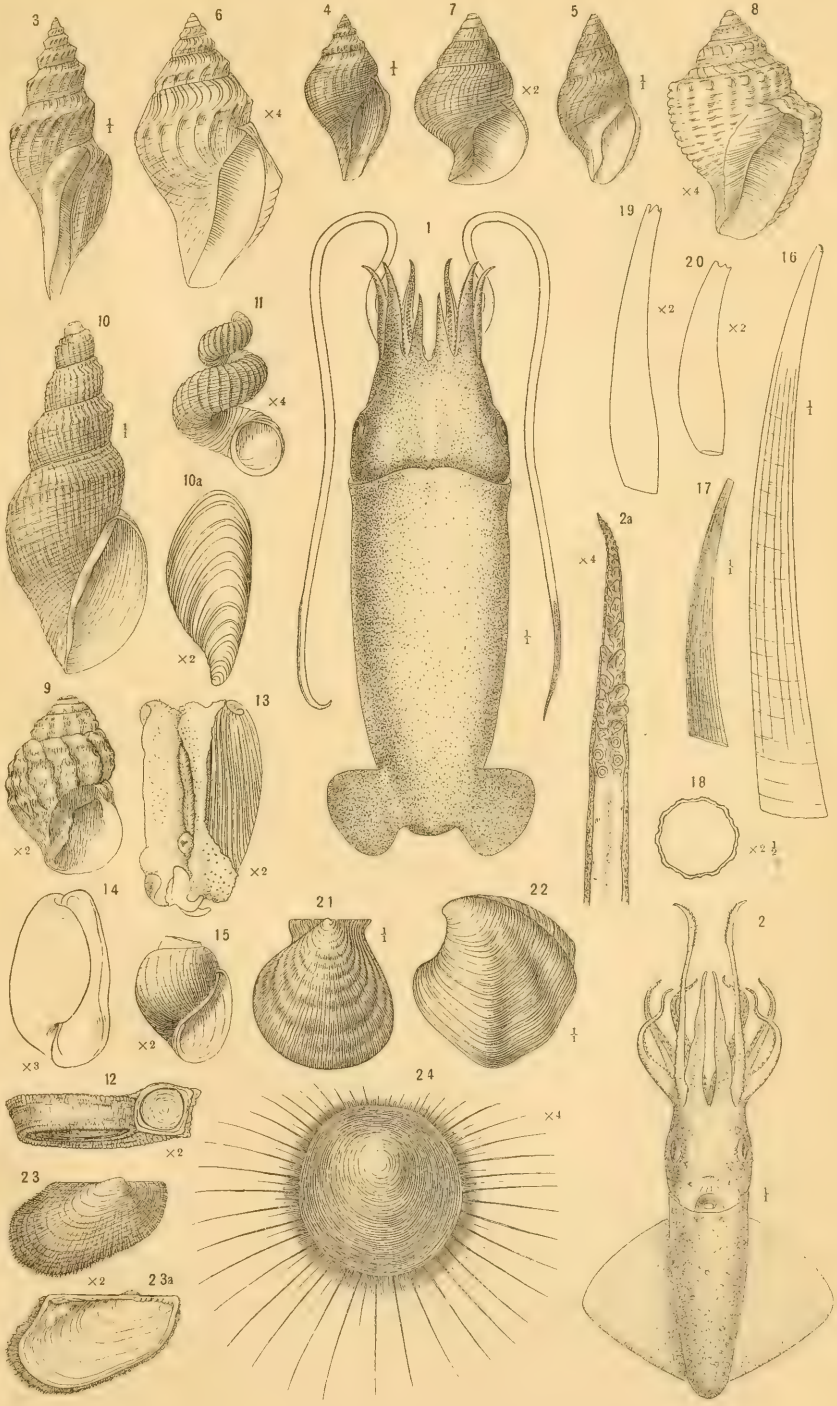
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